PAPERS

ON

AGRICULTURE,

CONSISTING OF

COMMUNICATIONS

MADE TO THE

Maſſachuſetts AGRICULTURAL SOCIETY;

WITH *EXTRACTS* FROM

VARIOUS PUBLICATIONS;

BY

The Truſtees of the Society.

BOSTON:
PRINTED BY *YOUNG* AND *MINNS*, PRINTERS TO THE STATE.

1801.

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PREFACE.

To the FARMERS *of* MASSACHUSETTS.

IN preſenting you with the following Papers, the Truſtees of the *Maſſachuſetts Society for promoting Agriculture*, feel a ſenſible regret, that they do not comprize more original matter. After their repeated invitations to thoſe who are engaged in agricultural purſuits to communicate to them "every hint, obſervation and experiment, relating to huſbandry," they flattered themſelves, that they ſhould have been furniſhed with abundant matter for the preſent volume.

THEY, however, are much indebted to thoſe gentlemen, whoſe communications are contained in the ſubſequent papers. To ſupply the deficiency of original information, they have had recourſe to ſuch printed works, as, in their opinion, will furniſh the induſtrious farmer, with many hints for experiments, which may prove highly advantageous.

AMONG the papers that are original and American, the letter from Mr. COOPER is of the utmoſt importance. It has long been thought, that an exchange of ſeed from the ſouth to the north, or from north to ſouth, was abſolutely neceſſary to enſure a good crop. But from the experiments of that gentleman it clearly appears, that this neceſſity is ſuperſeded by a proper ſelection of the earlieſt, ſtrongeſt and moſt flouriſhing ſtalks from which the ſeed for corn, wheat, rye, &c. ſhould be taken, and the faireſt and beſt favored roots. The Truſtees, therefore, recommend an attentive peruſal of that communication to every agriculturiſt.

AN attention to the preſervation of fruit trees, and particularly to the culture and management of orchards, is, at the preſent period, of the utmoſt conſe-

quence

quence to the fruiterer and manufacturer of that wholeſome and agreeable liquor, which has become ſo neceſſary to the people of New England. If any of the papers in the following ſelection have a tendency to excite the public attention to this important object, the Truſtees will be highly gratified.

But of all the ſubjects that require the ſerious conſideration of the practical farmer, manures, and their proper application to different ſoils, are among the firſt. Upon this ſubject a proper attention has not yet been beſtowed, though of primary importance, and upon which, in a great meaſure, in our climate and ſoil, the ſucceſs of the huſbandman depends.

Impressed with this idea, the Truſtees have concluded that they could not furniſh their readers with a more acceptable and inſtructive entertainment, than is contained in the copious extracts from a late report, preſented by the Board of Agriculture in *England*, to our Society. It contains information from what various materials manures may be collected, their application to different ſoils, and the probable ſucceſs ariſing from ſuch judicious management. They cannot forbear to enforce upon every agricultural man a careful peruſal of thoſe extracts.

In reſpect to the premiums now offered, they beg leave to obſerve, that inaſmuch as the canker-worm has in ſome places made its appearance again, it is judged proper to continue the premium for the moſt effectual and cheap method for its deſtruction, and alſo for that of the ſlug-worm.

The great conſumption of wood and timber beyond the annual growth, muſt, in the ſettled parts of our country, ſoon leave us deſtitute of both, unleſs remedied by propagation, and muſt excite the ſerious concern of every friend to the public proſperity. To induce the farmer to cultivate foreſt trees, and particularly the oak, the Truſtees have thought it expedient to offer a premium for raiſing, from the ſeed, ſuch

foreſt

foreſt trees as are deemed the moſt uſeful; and they hope to ſee the time when no man will cut a tree from his land without planting two in its ſtead.

Should any thing contained in this publication prove beneficial to the intereſts of agriculture, or any way tend to promote that important ſcience, the Truſtees will think themſelves well rewarded for their trouble.

PREMIUMS

Offered by the TRUSTEES *of the* MASSACHUSETTS SOCIETY *for* PROMOTING AGRICULTURE.

1*st*. TO the perſon who ſhall diſcover an effectual and cheap method of deſtroying the Canker-worm, and give evidence thereof, to the ſatisfaction of the Truſtees, on or before the 1ſt day of October, 1803, a premium of *one hundred dollars*, or the Society's gold medal.

2*d*. AND a Premium of *one hundred dollars*, or the Society's gold medal, to the perſon who ſhall, on or before the 1ſt day of December, 1803, diſcover an effectual, and the cheapeſt method of deſtroying the *Slug-worm*, and give evidence thereof to the ſatisfaction of the Truſtees.

3*d*. AN annual Premium of *thirty dollars* for five years, to the perſon who ſhall introduce into the ſtate of *Maſſachuſetts*, for the purpoſe of propagation, a ram or ewe of a breed ſuperior to any now in the ſtate; if from a foreign country, *fifty dollars*. Claims to be preſented on or before 1ſt of October annually.

4*th*. To the perſon who ſhall produce the largeſt quantity of wool, meat and tallow, from the ſmalleſt number of ſheep, not leſs than one ſcore, raiſed on his own farm, a premium of *thirty-dollars*, to be claimed on or before the 1ſt day of Auguſt, 1804.

5*th*. To the perſon who ſhall, in one year, by a method new and uſeful, or that ſhall be an improvement on the methods already practiſed, make the greateſt quantity of compoſt manure in proportion to the expenſe, to be of a good quality, and compoſed of materials common to moſt farms; the quantity to be at leaſt two hundred tons, and the claim to be accom-

panied

panied with a deſcription of the yard or place, and the mode in which the ſame is made, a premium of *fifty dollars*, or the Society's gold medal. And for the next greateſt quantity, being not leſs than one hundred tons, *thirty dollars*. Claims to be preſented previous to the 1ſt of Auguſt, 1803.

6*th*. To the perſon who ſhall ſhew, by actual experiment, on not leſs than two acres, to the ſatisfaction of the Truſtees, a new or improved, being the beſt and cheapeſt method, of introducing fine graſs, fit for hay or paſture, into low freſh meadows, now producing coarſe wild graſs, or buſhes, a premium of *thirty dollars*. Claims to be preſented before the 1ſt November, 1804.

7*th*. To the perſon who ſhall diſcover any ſpecies of graſs, not commonly cultivated or known, of a quality for the food of neat cattle or horſes, equal or ſuperior to thoſe now in uſe, *fifty dollars*. Claims to be preſented on or before 1ſt October, 1804.

8*th*. To the perſon who ſhall exhibit diſtinct ſpecimens of the greateſt variety of graſſes in general uſe, and ſpecify, to the ſatisfaction of the Truſtees, their reſpective qualities, productiveneſs and uſefulneſs as food for different kinds of animals, a Premium of *fifty dollars*, to be claimed on or before the 1ſt October, 1803.

9*th*. To the perſon who ſhall produce from ſeed, the beſt growth of thrifty trees, not leſs than 600 in the whole, and in the proportion of 2400 to the acre, of any of the following kinds of foreſt trees, *viz*. oak, aſh, elm, ſugar maple, beech, black or yellow birch, cheſnut, walnut or hickory, *twenty-five dollars*; if all of oak, *fifty dollars*. Claim to be made on or before the 1ſt October, 1806.

10*th*. To the perſon who ſhall aſcertain, by accurate analyſis, the conſtituent parts of ſeveral fertile ſoils reſpectively, and in like manner the parts of ſeveral poor ſoils, and thus ſhall diſcover the defects of the latter; and ſhall ſhow, by actual experiments, how the ſaid defects may be remedied by the addition of earths or

other

other ingredients, which abound in the country, and in a manner that may be practiſed by common farmers, *fifty dollars*. And if it ſhall appear to the ſatisfaction of the Truſtees that, upon an extenſive practice, the improvement of the poor ſoil would be more than equivalent to the EXPENSE of the improvement, the addition of *one hundred dollars*. A minute deſcription of the ſeveral ſoils, and all the circumſtances attending the proceſſes, cultivation and reſults, will be required. Claims to be made on or before November, 1804.

11*th*. It is required that the Communications, for which the foregoing Premiums are offered, be accompanied with proper certificates from the Selectmen, Magiſtrates or Clergymen of the vicinity, or other vouchers, to the ſatisfaction of the Truſtees; that they be delivered in without names, or any intimation to whom they belong; that they be ſeverally marked in ſuch manner as each claimant ſhall think fit; the claimant ſending alſo a paper, ſealed up, having on the outſide a correſponding mark, and on the inſide his name and addreſs.

By order of the Truſtees.

JOHN AVERY, Secretary.

AGRICULTURE.

ON THE *CULTURE* AND *CURING* OF *HEMP.*

BY A GENTLEMAN IN *MARYLAND.*

THE extenſive uſefulneſs of Hemp, the little interference of its culture with the other work of farmers in America; and, *when water-rotted*, the eaſe with which it is prepared for *rope*, as well as the general certainty of the crop with a good price, led me to admire it in preference to other uncommon articles of crop.

Much is ſaid of the cultivation of Hemp; and there appears a conſiderable variety in the modes of management. My practice was ſimple. Ground, level and rather low, not wet, and a mellow *loam*, whether of the ſandy or clayey ſorts, was preferred. Theſe ſoils are not cold; and when well cleaned and prepared by repeated plowings and a due quantity of manure, they are in condition to yield *many repeated crops* of Hemp; a little manure being now and then added.*

Farmers without experience, if not alſo without thought on the ſubject, ſay their lands will not bring Hemp

* Mr. Young ſpeaks of a piece of ground at Hoxne, in Suffolk, England, which has been under crops of Hemp for *ſeventy ſucceſſive years.*

Hemp. Moſt kinds of ſoil will yield good crops of it, if not wet. If poor, manure them. Every huſbandman can manure and cultivate land enough for giving him rich crops of Hemp. The plowings for reducing ground to a mellow garden-like ſtate ſhould be many, preceding the *firſt* ſowing. Every time that young weeds appear, plow them in repeatedly. When the ground is thus well cleared of the ſeeds of weeds, then ſow Hemp-ſeed, and repeat it, year after year, on the ſame ground; giving it a little manure and *two autumnal plowings;* and the like plowings with harrowings in the next ſpring, immediately before ſowing.—If to cultivate an acre thus highly, ſhould deter the farmer, let him at firſt try a fourth of it; which would give him more than he would want of traces, leading lines and other rope. The ſpinning and working of it up would be mere play: but, as is ſeen below, making as much Hemp as he can for market, would yield him a good income.*

April, when the ground is moiſt, clean and mellow, in garden-like condition, from plowings and harrowings, is the time for ſowing Hemp. The plants then ſoon appear, and rapidly cover and ſhelter the whole ſurface of the ground; whereby weeds are kept under, and exhalation is greatly prevented. My Hemp never ſuffered materially from drought but once, and that of a ſowing in May. It was never found neceſſary to weed what was ſowed for a crop; but only ſuch as was ſown thin for producing ſeed. Sometimes ſeed was ſaved from the margin of the field, where the plants had room to branch, and were coarſe.

When the male or impregnating plants ſhewed maturity by ſome change in the colour, and by the fari-

na

* The tobacco planter thinks nothing of cultivating twenty acres in tobacco, and erecting four or five large framed houſes for curing it. But he would ſtart at a propoſal, that inſtead of tobacco he ſhould cultivate the twenty acres in Hemp, altho' it would require but one ſuch houſe, not an eighth of the labour and attentions, and is without any of the uncertainty. It is a common miſtake that Hemp requires low ground or rich bottom land. Almoſt any manured land that is not wet, may be made to yield good crops.

na or duſt flying off from the bloſſoms, all was pulled up, both male and female: and the pulling of every day was put into a ſalt water cove, in the evening of the ſame day, bound up in ſmall bundles, and ſunk $4\frac{1}{2}$ feet in the water, in a thick ſquare bed. On the third day it was inſpected; and from the third to the fifth it was enough rotted, as it is called. In examining it with finger and thumb ſome of the roots were broke. If they bent or were tough, it was not enough: when they ſnapt off ſhort like glaſs, it was enough: but the bark alſo was tried. The Hemp was then taken out of the water, and the heads laid ſloping down to drain 'till morning; for it was uſually taken out in the evening. In the morning it was ſpread, and whilſt drying, once turned. In a few fair days it was dry, and then carted to an old tobacco houſe, where it was bulked up 'till the hurry of ſecuring the other crops was over. It was broke and ſwingled in the next winter. Some of it was made into ropes for my farms: the reſt ſold to rope-makers, from the ſwingle. The rope was bright and ſtrong, and ſaid to be of a quality entitling it to the bounty then offered for *water-rotted* Hemp.

A ſmall part of one of my crops of Hemp was *dew* rotted: which was ſufficiently diſguſting to forbid a repetition of that mode. It was a tedious while on the ground. Winds blew it about and entangled it. It rotted partially: not the whole of the ſame fibre alike. Here it was ſtrong: there weak.

Where there is only a ſtream of water, it might be proper not to place the Hemp in the ſtream; but, digging a deep oblong receptacle, let a ſufficiency of the ſtream paſs through it, when full, on one ſide of the natural current. There rot the Hemp in clean water; which ſhould conſtantly be coming into and paſſing through the pit, in a degree of plenty for preſerving the water from corrupting or being ſtagnant; but not ſo rapidly as to fret off its bark.*

After

* The operation, improperly called *rotting* of Hemp, ought to avoid

After pulling the Hemp, weeds grew up; which were reduced, and the ground was left in clean condition 'till the ſpring, by plowings.

Having no minute of the quantity of ſeed ſown, I can only recommend what ſeems beſt. But it greatly depends on the ſtate of the ground, and the purpoſes for which the crop is intended. A little experience will aſcertain the proper quantity. Two buſhels of ſeed to an acre, I believe, are a full portion for rope. A little leſs might be about the quantity I ſowed.

If the ground be good and well prepared, no crop is more certain than Hemp, ſowed in time, and when the ſoil is moiſt. Hemp ſhades the ground from May 'till about the firſt of Auguſt, and from early Auguſt it would be advantageouſly ſheltered with a growth of buckwheat, 'till this bloſſoms; and then during a temperate ſtate of heat, it is plowed in as a manure. Buckwheat muſt not run to *ſeed* on ground to be ſown with Hemp. I have had it ſpiring up and contending with growing Hemp, 'till the buck has been five feet high.

The heavieſt work in procuring Hemp, is the *breaking* and ſcutching or ſwingling it. But as it is the work of leiſure winter, and every perſon who ſtrips Tobacco can break and ſwingle Hemp: and moreover as hirelings, if neceſſary, are in that ſeaſon eaſily obtained, this bugbear part of the buſineſs can aſſuredly be accompliſhed, and the Hemp got rid of at market in the ſpring.

For the country houſe-wife, who wiſhes for information, the following is inſerted, as what I have read of a method of *ſoftening* and *preparing* Hemp, for making it into linen. The Hemp is laid at full length in

every tendency to *rot* or *ferment* the plant. Water when pure and lively does not *rot*, but it *diſſolves* a viſcous gummy ſubſtance which had bound the fibres of the bark together and to the body of the plant. The pureſt water is the beſt *diſſolvent* of ſuch viſcous ſubſtances. I have ſeen Hemp which had been rotted in ſtagnant dirty water; the appearance whereof was bad. The Hemp I rotted in clear tide-water, had a light ſtraw colour.

in a kettle. If the kettle is too ſmall to admit it at full length, the Hemp may be doubled, but without twiſting it; only the ſmall end of every hand is twiſted a little, to keep the hands whole, and from tangling. Smooth ſticks are laid in the bottom of the kettle, acroſs and acroſs, three or four layers, according to the ſize and depth of the kettle; which is for keeping the Hemp from touching the liquor. Then pour lie of middling ſtrength, half the ſtrength of that for ſoap, gently into the kettle 'till it riſes nearly to the tops of the ſticks. The Hemp is then laid in, layer croſſing layer, ſo that the ſteam may paſs through the whole body of the Hemp. The kettle is now covered cloſe as can be, and hung over a very *gentle* fire to ſtew or ſimmer, but not boil, ſo as to raiſe a good ſteam for 6 or 8 hours. It is then taken off, and let ſtand *covered* 'till the Hemp is cool enough to be handled. It is now taken out, and wrung very *carefully* 'till dry as can be: then hang it up *out of the way of the wind*, in a garret or barn with all the doors ſhut. Here it remains, now and then turning it, 'till perfectly dry. Then pack it up in a *cloſe*, dry place, 'till it is to be uſed. Yet at times it is to be viſited, and examined if any part has become *damp*. At leiſure, *twiſt up* as many hands of Hemp as are intended for preſent uſe, *hard* as you can; and with a ſmart, round, ſmooth hand-beetle, on a ſmooth ſtone beat and pound each hand by itſelf, all over very well, turning it round till all is well bruiſed. Then untwiſt and hackle it through a coarſe, and after it through a fine hackle. Hackling is performed in the ſame manner as if combing a fine head of hair; beginning at the *ends* below as theſe are entangled, riſing higher and higher: at laſt the top of the head is reached. The firſt tow makes country rope; the ſecond, oznabrigs, ſheeting and bagging; and the pure Hemp excellent linen.

B.

January, 1799.

IMPORTANT INFORMATION IN *AGRICULTURE* AND *GARDENING.*

In a letter from JOSEPH COOPER, *Esq. of New-Jersey to a gentleman in Philadelphia.*

COOPER'S-POINT, 17th APRIL, 1799.

RESPECTED FRIEND,

KIND Providence having placed me in a station of life which obliged me to procure a living by industry, and that principally in the agricultural line, it has caused me to be a strict observer of the works of nature, with respect to such parts of the vegetable creation as have come under my particular notice, and have been greatly embarrassed at the opinion very generally entertained by farmers and gardeners, that changing seeds, roots and plants to distant places, or different soils or climates, is beneficial to agriculture, not agreeing with my observations or practice. This induced me to make many experiments on that head, all of which in more that forty years practice have operated to prove to my satisfaction, that the above opinion is not well founded, and if so, must be extremely prejudicial to agriculture, as it turns the attention of the husbandman from what appears to me one great object, viz. that of selecting seeds and roots for planting or sowing, from such vegetables as come to the greatest perfection in the soil which he cultivates.

What induced me to make experiments on that head, was, observing that all kinds of vegetables were continually varying in their growth, quality, production and time of maturity. This led me to believe that the great author of nature, has so constructed that wonderful machine, if I may be allowed the expression, as to incline every kind of soil and climate to naturalize all kinds of vegetables, that it will produce at any rate, the better to suit them, if the agriculturists will do their part in selecting the most proper seed. In sup-

port

port of which I will take the liberty of ſubjoining a few facts and experiments, out of an inconceivable number which have all combined to prove the above to my ſatisfaction.

In, or about the year 1746, my father procured the ſeeds of the long warty ſquaſh, which have been kept on the farm ever ſince, without changing, and are now far preferable to what they were at firſt. Our early peas were procured from London the ſpring before Braddock's defeat, and have been planted ſucceſſively every ſeaſon ſince on the place. They have not been changed, and are now preferable to what they were when firſt obtained. The ſeed of our aſparagus was procured from New-York, in the year 1752, ſince which time I have not planted a ſeed but what grew on my beds, and by ſelecting the ſeed, from the largeſt ſtalks I have improved it greatly.

A complaint is very general, that potatoes of every kind degenerate, at which I am not ſurpriſed, when the moſt proper means to produce that effect is conſtantly practiſed; to wit, uſeing or ſelling the beſt, and planting the refuſe; by which means almoſt the whole of thoſe planted are the produce of plants the moſt degenerated. The conſideration of which induced me to try an oppoſite method. Having often obſerved that ſome plants or vines produced potatoes larger, better ſhaped, and in greater abundance than others, without any apparent reaſon except the operations of nature, it induced me to ſave a quantity from ſuch only for planting the enſuing ſeaſon, and I was highly gratified in finding their production exceed that of others of the ſame kind, planted at the ſame time, and with every equal advantage, beyond my expectation, in ſize, ſhape, and quantity; this induced me to continue the practice, and I am ſatisfied that I have been fully compenſated for all the additional trouble.

A circumſtance happened reſpecting potatoes, which may be worth relating; a woman whom I met in market requeſted me to bring half a buſhel of ſweet

potatoes

potatoes for ſeed the next market day, which I promiſed to do, but going through the market on that day, previous to her ſon's coming for the potatoes, I obſerved the woman ſelling ſuch as I had brought for her, when the boy came, I aſked him the reaſon they wanted potatoes for ſeed, while they were ſelling their own; his anſwer was that his father ſaid, if they did not get ſeed from me once in three or four years, their potatoes would be good for nothing.—QUERY, if he had uſed the ſame means in ſelecting his potatoes for planting as I did, whether he would have profited by changing with one who uſed the other method.

In diſcourſing with a friend, who lived at a great diſtance from me on the above ſubject, he introduced two inſtances in favour of changing ſeed, one was Aſparagus, the other Radiſh ſeed, he had from me, the production of both he ſaid was preferable to any thing of the kind ever ſeen in that neighbourhood, which was near 100 miles diſtant, to which he aſcribed the benefit; but in two or three years the Radiſhes degenerated ſo as to be no better than what he had before; I aſked his method of ſaving ſeed, he ſaid he had no other Radiſhes in his garden, and when they had pulled what was fit for uſe, let the others go to ſeed. I then told him my method, viz.—As ſoon as Radiſhes are fit for uſe, I dig up ten or twelve of thoſe which pleaſe me beſt, as to colour, ſhape, &c. and plant them at leaſt 100 yards from where any others bloom at the time they do—this, I informed him, was the beſt method I knew of, to improve any kind of vegetables, varying the proceſs agreeable to their nature, and as he had, in my opinion, taken the moſt proper method to degenerate his, I aſked if he thought I ſhould be benefited by exchanging with him? His anſwer was, he believed I was the beſt gardner.

In, or about the year 1772, a friend ſent me a few grains of a ſmall kind of Indian corn, the grains of which were not larger than gooſe ſhot, which he informed me, by a note in which they were encloſed,

were

were originally from Guinea, and produced from eight to ten ears on a ſtalk. Thoſe grains I planted, and found the production to anſwer the deſcription, but the ears ſmall, and few of them ripe before froſt. I ſaved ſome of the largeſt and earlieſt, and planted it between rows of larger and earlier kinds of corn, which produced a mixture to advantage; then I ſaved ſeed from ſtalks that produced the greateſt number of the largeſt ears, and firſt ripe, which I planted the enſuing ſeaſon and was not a little gratified to find its production preferable both in quantity and quality to that of any corn I had ever planted. This kind of corn I have continued planting ever ſince, ſelecting that deſigned for ſeed in the manner I would wiſh others to try, viz.—When the firſt ears are ripe enough for ſeed, gather a ſufficient quantity for early corn, or replanting; and at the time you would wiſh your corn to be ripe generally, gather a ſufficient quantity for planting the next year, having particular care to take it from ſtalks that are large at bottom, of a regular taper, not over tall, the ears ſet low, and containing the greateſt number of good ſizeable ears of the beſt quality; let it dry ſpeedily, and from the corn gathered as laſt deſcribed, plant your main crop, and if any hills ſhould be miſſing, replant from that firſt gathered, which will cauſe the crop to ripen more regular than is common, which is a great benefit. The above mentioned I have practiſed many years, and am ſatisfied it has increaſed the quantity, and improved the quality of my crops beyond what any perſon would imagine, who has not tried the experiments. The diſtance of planting corn, and number of grains in a hill, are matters many differ in; perhaps different ſoils may require a difference in both theſe reſpects; but in every kind of ſoil I have tried, I find planting the rows ſix feet aſunder each way, as near at right angles as may be, and leaving not more than four ſtalks in a hill, produces the beſt crop. The common method of ſaving ſeed corn, by taking the ears from the

heap, or crib, is attended with two diſadvantages; one is, the taking the largeſt ears, which have generally grown but one on a ſtalk. This leſſens the production; the other is, taking ears that have ripened at different times, which cauſes the production to do the ſame.

A ſtriking inſtance of plants being naturalized happened by Colonel Matlock ſending ſome water-melon ſeed from Georgia, which he informed me by letter were of ſuperior quality; knowing ſeed from vegetables which had grown in more ſouthern climates, required a longer ſummer than what grew here, I gave them the moſt favorable ſituation, and uſed glaſſes to bring them forward, yet very few ripened to perfection; but finding them to be as excellent in quality as deſcribed, I ſaved ſeed from thoſe firſt ripe; and by continuing that practice four or five years, they became as early water-melons as I ever had.

Many admit the above errors from foreign flax-ſeed producing the beſt flax in Ireland; but when it is conſidered that it is the bark of the ſtalk only, that is uſed in Ireland, which is in the beſt perfection before the ſeed is ripe, and that part not uſed from any other plant except hemp, the argument falls to the ground when applied to other vegetables.

For many years paſt, I have renewed the whole ſeed of my winter grain, from a ſingle plant which I have obſerved to be more productive, and of better quality than the reſt, which I am ſatisfied, has been of great uſe, and I am fully of opinion, that all kinds of garden vegetables may be improved by the foregoing methods; particular care being taken that different kinds of the ſame ſpecies of vegetables are not in bloom at the ſame time near together, as by that happening, they mix, degenerate, and each kind is injured.

I am ſenſible the foregoing will meet with great oppoſition and contradiction, but as an experiment is ſafe and eaſy, I hope it will induce perſons of more leiſure, ability, and obſervation than myſelf, to make trial,

trial, as a mean of improving the agriculture of our country, which is the ſincere wiſh of thy friend,

JOSEPH COOPER.

OBSERVATIONS *on a* SPECIES *of* EARTH *found in* WEYMOUTH, *preſented to the* AGRICULTURAL SOCIETY *of* MASSACHUSETTS, *by Dr. TUFTS.*

THIS earth is of a very pale clay colour, moderately heavy, of a looſe texture, ſomewhat harſh to the touch, and handled ever ſo ſlightly leaves a powder on the fingers. It adheres very ſlightly to the tongue, melts readily in the mouth, and is very gritty between the teeth. In the fire it gains a little additional hardneſs and a darker colour. It effervesces ſcarcely, if at all, with acids, and in water falls firſt into floculi and then into a fine powder.

A piece of it, placed gently in ſome muriatic acid, the air in its interſtices was extricated in a great meaſure at once, and the earth began immediately to ſubſide in very fine floculi; but nothing appeared which could be called effervesſcence. The fluid remained clear.

In the nitrous acid, air not ſo ſpeedily extricated as in the former, and that in very ſmall globuli. The earth ſubſided inſtantly in a fine powder, air continuing to riſe in very minute bubbles after the powder was wholly ſubſided. The fluid remained clear.

In the vitriolic acid, the earth abſorbed the fluid gradually and ſunk; part of its air extricated on ſinking in large globuli; it began then to crack into fragments, the air continuing a little while to riſe; but ſtill in larger bubbles than in the other acids; the earth ſubſided in part and very gradually in coarſe flakes; but was a long time before it entirely loſt its form. The fluid remained as before.

In the acetous acid (not diſtilled; but ſharp), a greater quantity of air appeared to riſe, and the earth

ſubſided

ſubſided immediately in a fine powder; but without effervescence.

In Sp. Ammoniæ the air was immediately emitted with a hiſſing noiſe, which was not the caſe in any of the foregoing; the earth then ſwelled, divided by numerous fiſſures, and fell into fragments, and finally into floculi.

Hence it appears that this Earth has no chemical affinity with either the vegetable or mineral acids; and it ſeems probable that it has ſome ſlight degree of acidity from its appearance in the laſt menſtruum.

It appears to be, not a marle; but a natural loam, which is imitated by art when clay is applied to ſandy ſoils. I ſuſpect, however, that this earth is *per ſe* barren, and would be ameliorated by the addition of marle.

ON MANURES.

Extract of a letter from Dr. FOTHERGILL.

BATH, NOV. 12, 1799.

THE utility of manures depends on this plain propoſition. They are applicable either to improve the conſiſtence of the ſoil, to correct ſome vice, or to ſupply ſome defect. A ſoil is more or leſs perfect according to its texture, and as it retains a juſt proportion of water, and no manure can afford direct nouriſhment to plants unleſs it be ſoluble in water. Even ſimple water itſelf, in paſſing through the exquiſite organization of vegetables, apparently undergoes a decompoſition, ſince its portion of oxygen is exhaled as an excrementious fluid, while its hydrogen is retained, as ſubſervient to nutrition. Carbon, indeed, by ſome able writers, is conſidered as the principal food of plants; being inſoluble, however, in water, except in the form of carbonic acid gas, this opinion is not very probable.

probable. Beſides water, diveſted of carbonic gas by diſtillation, has been found ſufficient to ſupport vegetation. The grand ſecret in the art of Agriculture is to diſcover earths beſt adapted to retain the due proportion of water that falls in each particular country, and to exhale what is redundant. A clayey ſoil generally retains too much, a ſandy ſoil too little, conſequently ſuch ſoils may be made by a proper mixture mutually to correct each other. It is moreover neceſſary, not only to know the defect of a ſoil, but the quantum of defect, which can only be aſcertained by analyzing a portion of the defective ſoil, and by comparing its conſtituent parts with the analyſis of a highly fertile ſoil, kept as a ſtandard. The nature of the climate and the average quantity of rain that falls in each particular diſtrict, ought alſo to be taken into the account. Hence it would appear, that the philoſophical agriculturiſt ought to be well acquainted with the principles of chemiſtry and meteorology, as well as thoſe of experimental philoſophy.

"*Vere ſciere*, ſays the illuſtrious Bacon, *eſt per cauſas ſciere ;*" and if knowledge be power, as he elſewhere affirms, it ſurely never can be better employed than in the cauſe of Agriculture, which demands not only patient aſſiduity, but conſummate judgment. By a happy combination of theſe, we are informed, that the rude barren mountains of the Cavennes, formerly deemed incapable of cultivation, are now annually crowned with luxuriant crops. The ſame has been obſerved in many parts of the Chineſe empire.

ON APPLE TREES.

A letter from Mr. J. KENRICK, jun.

NEWTON, FEB. 27th, 1800.

DEAR SIR,

I Have lately had the pleaſure of peruſing the Agricultural Society's Communications to the public in 1799; and obſerving their requeſt, in a former publication, to practical farmers, freely to communicate the ſucceſs of their experiments in huſbandry, I have thought it proper to ſuggeſt the following hints on the culture of the apple tree, which are the reſult of my own experience.

I have always procured clean ſeed from late made cyder-cheeſes, which I found very eaſy.—By breaking the pomice, in a fine riddleſieve, the ſeed will find its way through, accompanied with but little of the pomice, which may be totally ſeparated with very little trouble.

If I would plant a pint, I mix it with about half a peck of good black loam, ſifted fine, put it in a box and ſet it abroad. Let it be expoſed to the weather through the winter; but ſecured from the mice or any other creature, by ſuch a covering as will not ſcreen it from *cold*, *ſnow* or *rain*.

When my land is ready, I then put my ſeed and earth in a pretty tight new baſket, and pump water into it, ſhaking the baſket till the earth is waſhed away and the ſeed left clean.

In April, as ſoon as the ground can be properly prepared, I chooſe a ſpot naturally rich, the ſoil black and deep, and enrich it plentifully with rotten manure and leach aſhes; line it out in ſtrait parellel rows, three feet a part, and plant the ſeed but an inch or two aſunder, perhaps two inches deep; the trees may be thinned to about ſix inches apart, pulling up the feebleſt. The advantage of the rows being ſo wide

will

will be obvious in the uſe of the plough among them, and in giving ſufficient room to inoculate, ſplice or graft. I have found the little trees will progreſs in this way much faſter than thoſe which have been taken up and tranſplanted, at one or two years old. Great advantage in the growth will be perceptible from the ground being ſuitably pulverized in the ſpring, when the ſeed (ready to ſprout) is put in.

If I wiſh the growth to be rapid, the weeds muſt be rooted out with the ſame care and perſeverance as in a bed of garden vegetables, the land annually manured, and the trees ſuitably pruned. In every ſtage of their growth, appletrees ſhould be effectually ſecured from ſheep and horned cattle, until they are totally out of their reach. When I ſet out an orchard of trees, I find it beſt to plough the land firſt, and ſet them but little, if any, lower than I plough; mix plentifully rotten manure; ſet them upright; the ſame ſide ſouth as they ſtood before, and in ſtrait rows; and plant the land for ſeveral years; annually manuring and conſtantly hoeing the trees with as much care, at leaſt, of each, as I take of a hill of corn or potatoes. But my greateſt attention is paid to ploughing among them; ever performing a part of this buſineſs with my own hand, carefully avoiding galling the trees. To effect this I uſe a ſhort whipple-tree, with a ſteady horſe and a careful man to lead, while ploughing near the trees.

The importance of keeping the whole orchard conſtantly cultivated, till the trees have attained a good ſize, is *very obvious*: Firſt, from comparing ſuch an orchard with one that remains in graſs, or even with the trees dug around a little; and ſecond from a critical examination of the roots and fibres of the two different ſituations. In the former they will be found to extend horizontally in every direction, drawing nouriſhment from a much greater diſtance than could eaſily be imagined without examination. In the third place, the progreſs of the roots horizontally

tally will be found to have been evidently impeded by the hardneſs of the ground, and robbed of their proper nouriſhment by the graſs. Here I muſt remark, that herdſgraſs is the moſt injurious to young trees of any kind of graſs I am acquainted with.

I have been taught, by experience and obſervation, totally to diſapprove of fixing ſtakes by trees, unleſs it be in a temporary manner, as a ſafeguard, while plowing near them with oxen. If the tree is tied up to ſtakes with a bandage, it generally receives damage where it is bound; if encloſed in ſtakes or a box, (like a bird in a cage) in high winds it ſeldom eſcapes being bruiſed. If the land, on which I ſet my trees, is expoſed to the wind, I commonly hoe the ſoil towards the tree, making it much thicker for a yard around than it was before; tread the ground well at the firſt ſetting of the tree, and diminiſh the top at leaſt equal to its loſs of roots in taking up; and I have not a doubt but the growth of the young tree, eſpecially of the roots, is accelerated by the winds. In caſe of an uncommon gale of wind, ſo as to blow the tree out of its perpendicular attitude, it may be eaſily righted, and will ſuſtain leſs damage than it would from ſtakes and bandages.

I have obſerved, that the ruſſeting tree requires a moiſt ſituation, and is leſs likely to thrive well in dry land than any kind I have noticed.

ON THE *PRESERVATION* OF *PEACH TREES.*

Extract of a letter from Mr. MOSES KEEP.

LEVERETT, APRIL 19, 1800.

SIR,

I Am of opinion that a ſandy ſoil, approaching towards a gravel, on ground deſcending towards the weſt and northweſt, is preferable for the planting or ſetting

ſetting out of peach trees. After they may have borne a few years, in any ſoil, it has been remarked, that the ſmall limbs are ſeen dry in many parts of the trees. To prevent their decay, I would propoſe the following method, which I have tried with great ſucceſs for theſe many years, viz. In the latter part of the month of June ſaw or cut off a large branch or two near the body of the tree. The ſprouts will immediately ſhoot out near the limb thus cut off—which will be very thrifty; repeat the ſame as the other branches decay; thus, in the proceſs, the whole top of the tree will become new, and grow nearly as faſt as young trees and as fruitful.

ACCOUNT *of a* METHOD *of* PREVENTING *the* PREMATURE DECAY *of* PEACH TREES.

By JOHN ELLIS, *of New-York.*

☞ The following communication has been publiſhed by order of the American Philoſophical Society, at a meeting held at Philadelphia, October 3, 1800. It is the eſſay which gained the premium offered for the beſt method of preſerving Peach Trees.

"THE decay of Peach Trees is owing to a worm which originates from a large fly, that reſembles the common waſp. This fly perforates the bark, and depoſits an egg in the moiſt or ſappy part of it: The moſt common place of perforation is at the ſurface of the earth, and as ſoon as the worm is able to move, it deſcends into the earth, probably from an inſtinctive effort to avoid the winter froſt. This may be aſcertained by obſervation, the tract of the worm from the ſeat of the egg being viſible at its beginning, and gradually increaſing, in correſpondence with the increaſing ſize of the worm: Its courſe is always downwards. The progreſs of the young worm is extremely ſlow, and if the egg is depoſited at any conſiderable diſtance above the ſurface of the earth, it is

long before the worm reaches the ground. The worms are unable to bear the cold of winter, unleſs covered by the earth, and all that are above ground after froſt are killed.

"By this hiſtory of the origin, progreſs and nature of the inſect, we can explain the effects of my method, which is as follows;—In the ſpring, when the bloſſoms are out. clear away the dirt, ſo as to expoſe the root of the tree to the depth or three inches; ſurround the tree with ſtraw about three feet long, applied lengthwiſe. ſo that it may have a covering one inch thick, which extends to the bottom of the hole, the but ends of the ſtraw reſting upon the ground at the bottom—bind the ſtraw round the tree with three bands, one near the top, one at the middle, and the third at the ſurface of the earth; then fill up the hole at the root with earth, and preſs it cloſely round the ſtraw. When the white froſt appears, the ſtraw ſhould be removed, and the tree ſhould remain uncovered until the bloſſoms put out in the ſpring.

"By this proceſs, the fly is prevented from depoſiting its egg within three feet of the root, and although it may place the egg above that diſtance, the worm travels ſo ſlow that it cannot reach the ground before froſt, and therefore is killed before it is able to injure the tree.

"The truth of the principle is proved by the following fact:—I practiſed this method with a large number of Peach Trees, and they flouriſhed remarkably, without any appearance of injury from the worm, for ſeveral years, when I was induced to diſcontinue the ſtraw with about twenty of them—all thoſe which are without the ſtraw have declined, while the others which have had the ſtraw continue as vigorous as ever."

It may be proper to mention, that Mr. Ellis tranſmitted to the Society a certificate, ſigned by thirteen perſons, in confirmation of the above facts.

JOHN R. COXE.

ORCHARDS.

ORCHARDS.

To Doctor A. Dexter, ſecond Vice-Preſident of the Maſſachuſetts Agricultural Society.

THE cultivation of Orchards is worthy of all the care that has ever been beſtowed upon it.—New opinions are indeed propagated of late years, and many converts are gained to the notion, that ſtrong beer is cheaper, wholeſomer, and more favorable to the ſtrength and morals of the laboring claſſes of ſociety than cyder. Every part of this creed is probably groundleſs. It is incredible, that barley can be raiſed by the plough, by the force of high tillage, and plenty of manure, cheaper than apple trees.—Every thing that is required to make beer is ſcarce and coſtly. The beſt of land, and of manure, are requiſite. *New-England* is a territory ſo rugged, and without plenty of manure ſo unproductive, that we buy a large part of our bread from other States. Shall we turn our very bread into ſtrong drink? If we do, we muſt buy the more bread from abroad. We may have more to drink but we ſhall raiſe the leſs to eat. Further, tillage is confeſſedly leſs profitable to the farmer than grazing. An orchard may be paſtured or mowed. Shall we bring ourſelves to think it economy to carry the leaſt profitable part of our farming a great deal further than ever, by converting our flouriſhing orchards into brown hungry barley fields? We muſt dig, and broil, and ſweat, and ſtarve our ſcanty cornfields to raiſe barley.

With the ſkill of a *London* Porter brewer, and ſome years fermentation and ripening in a great vat, beer or porter may be tolerably wholeſome, though always rather groſs and heavy to the ſtomach. It is rather victuals than drink, and in a country where the poor laborers are but half fed, this *objection* may be a good *reaſon* for preferring it to cyder. But it does not apply to the condition of the American laborers. With little capital, without any ſkill, without even much care

care in the preparation, beer, ſuch as our farmers would make it, would be a heavy, viſcid, ſmoaky, ill-fermented, muddling poiſon, that would make the ſtomach heave and the head ſwim. Drink the leſs, you will ſay. Drink none, I ſay. Moderation in the uſe of the liquor that is to diſplace rum, is a precept for the ſpelling-book and the almanac, and not for the lounging bench of a grog ſhop, or the bar-room of a tavern, fragrant with the ſteam, or floating in the juice of tobacco.

The queſtion really is, to find a liquor preferable to rum; and thoſe who would uſe ſtrong beer, as they ought, *with moderation*, are not the ſubjects of reform. The *temperate* may be allowed to taſte any liquor.—People never learn to be drunkards on cyder—they will never learn to be ſober with ſtrong beer.

As to the ſtrength of laborers, thoſe who are full fed probably need nothing but *diluents*, for which muddy beer is unfit. If they will uſe ſtimulating liquors, a ſmall quantity of rum is not, manifeſtly, the worſt thing that is to be choſen. The *abuſe* of it is, indeed, ſhocking, and vice grows out of drunkenneſs. But a drunkard on beer would overpower his ſtomach as well as his head, and would not ſtupify himſelf into better morals.

The beer of the beſt quality may be more ſuitable for invalids, and particularly for weak ſtomachs, too weak for ſolid food, (reader here is no contradiction) than cyder.—Cyder is, however, to be preferred to beer for laborers. Experience ſhews that the uſe of it conſiſts with ſound health and long life. Our habits are ſettled in favor of it. The New-Englanders are of all people the longeſt livers. Why then try an innovation ſo difficult, ſo doubtful, to ſay the leaſt, in point of health and œconomy, as the ſubſtitution of beer in the place of cyder? No, let us go on and plant orchards as our forefathers did; and if we can, by God's bleſſing, live as long and as well, and leave as good examples, and as precious inſtitutions to our children as they did to us, we may and ought to thank

God

God for the patrimony we enjoy, and the inheritance we ſhall have to bequeath to poſterity.

LAZARUS REDSTREAK.

An Agricultural Correſpondent has ſent the following obſervations on Orchards.

The proper ſoil for orchards is not a cold or wet one. Pear trees thrive in a ſtrong clay, but apple trees grow beſt in ſuch ground as will bear good corn, of which ground there is enough for tillage and orcharding both. It is a notion that an orchard will not grow in the place of an old orchard, that has been cut down. The firſt orchards were planted in a ſoil that was rank with the mulſh and leaves of ſome ages. Nothing could be more congenial to the growth of trees. It may be true, but it does not ſeem to be yet well proved, that a ſecond orchard will not flouriſh in the ſame lot where a former grew, provided the ground be well fitted for its growth. How is that to be done? By looſening the ſoil, and guarding the ſurface from drying up by a bed of hay, leaves or mulſh of any kind, as near as may be like that in which our foreſt trees flouriſh ſo much.

PLANTING THE TREES.

More care is needful in taking up the trees than in putting them down into the ground. Dig a circle round the tree you would remove, and looſen with a pick the ground near the ſtem, ſo as to get up, unhurt, a ſpreading root, and its lateral ſhoots. The tap root ſhould be fairly cut off with a mattock.

By hacking, and wringing, and twiſting the trees in tranſplanting, they ſuffer an injury which often makes them ſicken and die, and if they ſhould not, keeps them ſome years drooping without gaining any growth. The only advantage of planting young trees *deep*, is to prevent the roots drying up, and the wind rocking

rocking the ſtems ſo as to let the air into the roots. The diſadvantage of deep planting is doubtleſs to ſtint the firſt growth by the coldneſs of the ſoil, and the ſtems often appear moſſy. Small trees, that give little hold to the wind, are to be preferred to larger plants, and theſe may be planted at a moderate depth. The wounded roots ſhould be pruned carefully, and in July mulſh ſhould be laid about each tree to keep it from drying.

Self planted trees ſeem to flouriſh moſt, and laſt the longeſt. Even a hungry gravel will ſupport ſuch trees in health. The cauſe ſeems to be this. The ſtems and tops are very diminutive till the root, thirſting for its nouriſhment, ſtrikes deeper and deeper to find it. This goes on for ſome years, till being widely ſpread and deeply eſtabliſhed, the tree begins to ſhoot upward. The root then pours in a great deal of ſap, and the ſmall ſtem is far from woody and rigid to obſtruct its power. On the contrary, it is ſoft, elaſtic and yielding. Trees planted in poor ground ſuffer the very reverſe. They are generally planted with ſpreading tops, hard woody ſtems, ſcanty, dried, wounded roots. The power of ſap, that acts, is feeble, that which reſiſts action, is ſtrong; the tree ſtands like a ſtake for ſome years, and then makes ſome progreſs for a dwarfiſh growth and a ſhort barren life. Would it not be wiſe to follow nature? Plant apple ſeeds in poor ſoil, let them ſuffer adverſity, and get hardened to it, while they are of little greater ſtrength than the graſs. The round apple tree buſhes, bitten by the cattle, often ſhoot up into fine trees. The cattle, however, ought not to be allowed to crop any trees. In this way, a long-lived and flouriſhing orchard might be had, it is believed, on gravelly ridges, fit for almoſt nothing elſe. The firſt ten years would be rather diſcouraging, but after twenty they would exceed the beſt plants from a nurſery.

GRAFTING.

GRAFTING.

Every tree ſhould be grafted or inoculated. The methods of whip-grafting and inoculating ought to be generally practiſed, as they are better adapted to ſmall ſtocks than cleft grafting. Winter fruit is alone worthy of cultivation. The apples that ripen early are ſcarcely worth gathering. The cyder is poor, and the work of the farm that is interrupted by making it, is worth more than the fruit. The falling apples do the cattle no good, and ſometimes choak them. Some perſons, it is ſaid, have the art to make the beſt of liquor from early fruit, yet this is known by very few, if by any. Late-keeping fruit affords more leiſure and better choice of the proper time and weather for making into cyder. The fruit is worth more, the time is worth leſs. Of all apples, the ruſſitin is the beſt in the vicinity of *Boſton*. It is the moſt conſtant to bear, ſeldom bears too full ſo as to break the limbs, is ſo diſtributed over the large limbs of the trees as to eſcape froſts, excellent for uſe, for ſale and for cyder. It will not, however, bear neglect like meaner fruit. The trees need more manuring and care than moſt others, otherwiſe the apples will be very mean.

PRUNING.

The trees ſhould be pruned from the very firſt. With early care, the tops may be ſo ſpread, like the ſticks of a fan, that the natural growth of the limbs will be as it ſhould be, without interfering or choaking each other; and with little pruning afterwards, except of the ſmall twigs. The upright limbs are leſs fruitful than the horizontal.

CULTIVATION.

Ploughing orchards is recommended by many. It ſeems, however, not to be rational to expoſe the roots to inceſſant wounds, and to oblige nature to expend her ſtrength yearly to form new roots, to replace thoſe which

which the plough has disturbed. Accordingly, after a premature vigor, it is generally admitted that such orchards experience a premature decay. The following method is recommended. Plant the trees forty feet asunder in a grass lot. In March or April yearly, stir with a hoe a small circle two or three feet diameter round each tree, only deep enough to kill the grass, into which put one or two shovels full of hog-dung, that was laid a yard distant from the tree the fall before. The frost will take out its fire, and it will not mould or canker the tree as new dung certainly will. It is prudent, however, to lay this dung on the outside of the circle, that it may not touch the stem of the tree. Plough, if the land needs it, twenty-four feet of the forty between the rows, so as to leave each tree on a rim of grass sixteen feet wide. Then you may manure the whole lot for tillage first, and afterwards for mowing, as high as you please. The grass will be a net work about the fibres to prevent the fire of the dung from burning them up. Strained through the grass it will only fertilise the ground, and invite them to spread on the surface, and especially into the twenty-four feet ploughed land, that is richer and looser than the other part. The roots, spreading on the top, will afford a sweeter sap and higher flavored fruit, than if the tap roots should chiefly supply the vegetation from a great depth below. It is well-known, that orchards on the mountains yield a more acrid juice, and a less rich and pleasant cyder, than the cultivated plains or gentle slopes of the smaller hills.

A small number of trees, cultivated in the manner here recommended, will soon begin to bear fruit, will bear a great deal of fruit, and of the most profitable kinds. It is proper to add, that trees so cultivated will bear oftener. In poor soils, a bearing year is followed by six or seven barren years. But trees in rich fields will seldom fail of some fruit, and every other year will be a bearing year. The drink of the farmer's family from an orchard thus managed, will be a source of profit, not of expense, like his strong beer.

The

The mowing will be alſo an ample profit. The orchard graſs is yet very little known, but it grows very well in ſhade, and is excellent hay. Farmers, take theſe things into conſideration; and after having weighed them maturely, plant new orchards without delay. Learn the art; yet very imperfectly known, of making your cyder againſt the next hay time, ſo clear, ſound and ſparkling, as to keep you ſatisfied with the wholeſome drink, and plain and wholeſome cuſtoms and manners of your anceſtors.

On GIVING SALT to CATTLE.

An Extract from an ADDRESS *to the* BOARD *of* AGRICULTURE *in* ENGLAND, *by their Preſident,* *Lord* SOMERVILLE.

EVERY day's obſervation muſt add to our regret, that ſalt is not a component part of the food of ſtock, of ſheep more particularly. How many diſeaſes, ariſing from damp weather, from relaxation and from rank green food, might it not ſubdue. Our duty on ſalt forbids even the ſmalleſt waſte in its application, but by no means precludes its uſe. The ingenious and no leſs benevolent Count RUMFORD, tells us, that, in *Germany*, ſalt is univerſally given to oxen and cows in a fatting ſtate, and that their increaſe is in proportion to the quantity given.

We are all ſenſible of the effect of ſalt on the human body: We are told how unwholeſome, we know how unpalatable, freſh meat and vegetables are without it. The ancients held it in the higheſt eſtimation. It is notorious, that hay, mouldy from rain, is rendered palatable, and infinitely nutritious to cattle by ſimply ſtrewing ſalt on the hay at the rate of ten or fifteen pounds per ton when making. Equally notorious is it, that a ſenſible effect is hereby produced to the taſte, that cattle will prefer it to better hay,

which is well made, and will demand, when fed on it, much more water, which accounts for that aptitude to fatten, which is never denied to hay ſo ſalted. Salt is ſo important to cattle, and particularly to ſheep, that notwithſtanding the price is from 15*ſ.* to 20*ſ.* per buſhel in this country, it ought not to prevent the free uſe of it by good farmers.

ON THE SUBJECT OF MANURES.

From SOMERVILLE'S *Sketch of the General Report from the Board of Agriculture in* England.

PRELIMINARY OBSERVATIONS.

THE term Manure, is applied, indiſcriminately, to all ſubſtances, which are known from experience, either to enrich the different ſoils, or contribute, by any other means, to render them more favourable to vegetation.

Though little doubt can be entertained of the utility and neceſſity of ſuch ſubſtances, yet the progreſs hitherto made, in aſcertaining the mode in which they ought to be applied, the quantity that ſhould be made uſe of, or the ſoils for which they are reſpectively beſt adapted, has not yet reached that perfection or certainty that could be wiſhed for.

The moſt ſuperficial obſervation will ſerve to convince every intelligent perſon, that, in an agricultural point of view, the ſubject of Manures is of the firſt magnitude. To correct what is hurtful to vegetation in the different ſoils, and to reſtore what is loſt by exhauſting crops, are operations in Agriculture which may be compared to the curing of diſeaſes in the animal body, or ſupplying the waſte occaſioned by labour, or the ordinary evacuations of nature.

The utility of Manuring has, however, been queſtioned in ſome inſtances, particularly by Tull and his diſciples,

diſciples, who aſſert, that tillage alone, frequently and judiciouſly applied, will produce every effect that can be expected from that practice.

That tillage is eſſential to the ſucceſs of agricultural operations, is a point on which all good huſbandmen are agreed; but that by tillage alone, the earth ſhould be made to produce a ſucceſſion of valuable crops of grain or vegetables, is a doctrine, which, fortunately for the advancement of agriculture, has met with very few converts. By ſuch management, poor lands would never become productive, and the richeſt ſoils would ſoon be exhauſted.

Another opinion has been held forth to the public, that where land has once been put into good heart, it may be preſerved in a ſtate of conſtant fertility, merely by a proper rotation of crops, without any foreign Manure.

In ſome particular ſpots, where the ſoil is uncommonly rich, and has been long undiſturbed by the plough, and where great quantities of animal and vegetable matter have been accumulating for ages, this may, for a conſiderable ſpace of time, be the caſe.

But it is unneceſſary to extend our obſervations upon this ſubject farther, for a good farmer, who wiſhes to avail himſelf of every advantage which experience points out, will, to a certain degree, adopt, I. The tillage recommended of Tull, for the purpoſe of pulverizing the ſoil and extirpating the weeds with which it may be infeſted. II. A regular rotation of crops, in order that the various ſorts of earth, may, in their turn, according as they are calculated for different plants, become productive; and, III. A ſufficient quantity of Manure, not only to prevent the ſoil from being exhauſted, but, if poſſible, annually to make ſome additions to its former ſources of fertility.

For the purpoſe of bringing a ſubject of ſuch acknowledged importance as Agriculture, to a higher degree of perfection than it at preſent poſſeſſes, a thorough inveſtigation of every branch of it is neceſſary.

It is, however, to be regretted, that the foundation of the whole, namely, the principles upon which fertility and vegetation depend, are ſtill but imperfectly underſtood. Even the little knowledge of theſe matters which we are at preſent in poſſeſſion of, has hitherto been confined to the cloſets of the learned, and ſeldom been deemed a neceſſary part of education, for thoſe, whoſe proſpects and ſucceſs in life, depend ſo materially upon a judicious and ſcientific ſyſtem of huſbandry.

In the article of Manures, eſpecially, this knowledge would be peculiarly uſeful; for by it the intelligent farmer would be enabled to examine and aſcertain the diſtinguiſhing properties of the articles he makes uſe of; to collect, prepare and employ them to the greateſt advantage; and to accommodate them to the ſoil for which they are reſpectively the beſt adapted; and thus, by having it in his power to combine the cauſe and the effect, he would have the means of calculating, with much more certainty than it is poſſible for him otherwiſe to do, upon the ſucceſs of all his operations.

LIST OF MANURES.

Dung of quadrupeds,
—— of birds,
Night ſoil, or privy manure,
Urine,
Bones,
Putrid animal ſubſtances,
Refuſe of ſhambles,
Refuſe of manufactures,
Fiſh,
Sea weed,
River weed,
Mud from ponds, rivers or the ſea,
Sweepings of ſtreets,
Sweepings of roads,
Tanners' bark,
Putrid water from the ſteepings of hemp or flax,
Burnt lime-ſtone,
Unburnt or pounded lime-ſtone,
Chalk,
Limeſtone gravel,
Marle,
Sea ſhells and coral,
Pot aſh,
Kelp,
Bleachers' aſhes,
Soap aſhes,
Soap ley,
Fern aſhes,
Soot,

Soot,	Peat aſhes,
Peat moſs,	Wood aſhes,
Sheep folding,	Coal aſhes,
Ploughing in of green crops,	Aſhes from paring and burning,
Decayed vegetable ſubſtances,	Sea ſalt,
Watering,	Gypſum, or Paris plaiſter,
	Burnt clay.

OF COMPOSTS.

EVERY farmer of experience knows, that certain compounds, formed between the different kinds of manures and ſoils, have a much greater effect in promoting vegetation, than any of theſe taken ſeparately. But, though this circumſtance is familiar to moſt of them, they have hitherto made little progreſs in aſcertaining the manner in which compoſts are made, or the principles upon which their operation depends.

In analizing the different ſoils and manures we learn, that ſome of them contain more animal or vegetable matter, than they do ſalts or earths; and *vice verſa*. From this diſproportion of principles, ſuch ſoils and manures are leſs productive than they would otherwiſe be, if their uſeful qualities were more equally balanced. By compounding or mixing the two together, that end is attained.

That the dung of animals is a moſt valuable article is beyond all doubt; but it certainly is not equally uſeful in all ſoils and ſituations. It is much better calculated for what is called active than for inactive ſoils. On limeſtone, chalk, &c. &c. it meets with abundance of active materials which compenſate for the want of them in itſelf. But upon clays, deep loams, &c. &c. it operates beſt in conjunction with lime, or ſome other ſtimulating ſubſtance.

When earth is added to ſuch a compoſt, care ſhould be taken to regulate the quantity in ſuch a manner, as to prevent it from preſſing the dunghill too hard; for in every inſtance where this happens, the air will be excluded,

excluded, ſo much as to prevent a ſecond fermentation from coming on; and the compoſt, in that caſe, will neither incorporate ſo well, nor be ſo valuable.

OF A MIXTURE OF SOILS.

NEXT to the application of the various ſorts of manures above mentioned, the fertility of the earth depends upon the predominant qualities of the ſoil; every different kind of which being made up of the ſame principles, but differently proportioned. In caſes where there is a deficiency of any of theſe, the fault may be rectified by the application of another ſoil, containing the ingredients that are wanted. Thus where clay predominates, the additionof ſand is often ſufficient to inſure fertility, and where ſand prevails, the addition of clayor chalk anſwers the ſame purpoſe. Gravelly ſoil enriches moſs, and moſs improves gravel. Indeed, until the ſoil acquire a due proportion of the various ingredients that are neceſſary to inſure fertility, the huſbandman is particularly called upon to ſearch every where, in the neighbourhood of his fields, for ſuch ſubſtances as are likely to accompliſh this deſirable purpoſe. We wiſh this circumſtance to be particularly attended to, as there is abundant reaſon to believe, that every field has in its neighbourhood ſome ſubſtance, which, if properly applied, would give it freſh powers of production. To diſcover this, not only the ſurface, but the different ſub-ſoils ſhould be carefully examined, and it is more probable that ſome uſeful article will be found, which, if mixed either with the dung of the farm, or applied by itſelf, will render the ſoil more fertile.

The mixture of ſoils anſwers many very important purpoſes in agriculture. Stiff ſoils, which water can hardly penetrate, are by a proper mixture of light earth, ſand, or other incoherent ſubſtances, opened and ſubdivided, ſo as to admit freely a quantity of moiſture and other nutritive matters, ſufficient for the nouriſhment of plants.

Light

Light ſoils, again, by being incorporated with clay, are thereby rendered more retentive of moiſture; by this mixture alſo the roots of vegetables are at full liberty to ſpread themſelves in all directions, not only in ſearch of their natural food, but alſo to acquire an eſtabliſhment in the ſoil, ſufficient to ſupport the trunk and branches of the plant. For it is found, that no vegetable can arrive at perfection, if the roots are prevented from ſpreading themſelves out at pleaſure, and, at the ſame time, taking a ſufficient hold of the earth; neither of which can be the caſe in very ſtiff or looſe ſoils.

MODE OF APPLYING MANURES.

MANURE is uſually applied in three different ways. The firſt is that of ploughing it in and mixing it with the whole ſoil. The ſecond is that of laying it carefully into drills (or holes) and ſowing or planting the crop upon it. And the third is that of ſpreading or ſcattering it upon young crops, and either harrowing it in, or allowing it to remain upon the ſurface.

I. *MIXING WITH THE SOIL.*

AS yet, this is by far the moſt general mode of application in *England*, and where Manure can be had in great quantities, it is naturally adopted, the other modes being infinitely more troubleſome. It is alſo the beſt ſyſtem where it is neceſſary to enrich a field for a ſucceſſion of exhauſting crops. But it is queſtionable whether it is the beſt means to make the moſt of the Manure collected, as ſome of the moſt valuable parts of the Manure may be ploughed deeper than the roots of many vegetables go, and in ſome caſes may be entirely waſhed into the earth and loſt.

II. *MANURING IN DRILLS OR HOLES.*

THIS mode is but partially uſed, and only for particular crops, as indian corn, potatoes, turnips, and the like, when the advantages derived from the practice are ſo much extolled, though not deciſively aſcertained, that is a matter of ſurprize that it has not been extended to other deſcriptions of drill crops. The plant ſown upon the manure in this manner, has the chance of receiving the whole benefit of that manure in all the ſtages of its growth, and if the land is afterwards ploughed croſs ways, and well harrowed, what remains of its ſtrength and ſubſtance is incorporated with the ſoil. The crops produced by following this plan on very indifferent ſoils, and with a ſmall quantity of manure, it is aſſerted by the friends of this ſyſtem, will, ſometimes, equal what a rich ſoil, with a great quantity of manure, will yield.

N. B. Manuring in holes, as for indian corn and potatoes, in the U. States, correſponds to this, and ſecures to the cultivator all the advantages deſcribed.

III. *TOP DRESSING.*

TOP-DRESSINGS are principally confined to particular ſubſtances, ſuch as ſoot, rape-cake, pigeons' dung, peat aſhes, &c.* the beneficial effects of which, when applied in this way, are well known, and having been found to anſwer ſo well, particularly with crops which tiller, as wheat and barley, it is a matter entitled to the moſt ſerious inveſtigation, whether their ſucceſs has not riſen as much from the manner in which they are applied, as from their own eſſential qualities; and as this is a part of the ſubject which has hitherto been leſs conſidered than it deſerves, it requires to be more fully illuſtrated.

Any one may aſcertain by an eaſy experiment, that nearly the whole of the uſeful principles contained in well fermented dung may be extracted by repeated waſhings.

* Applicable to England only.

waſhings. When a conſiderable quantity of any manure, therefore, is laid upon land, and ploughed in or mixed with the whole ſoil, a great proportion of its richeſt ſalts will be carried down by the rains, and by that means will not only be loſt to the preſent crop, but, if the ſoil is of a looſe and porous nature, will very ſoon eſcape beneath the reach of the plough.

Were a contrary ſyſtem adopted, were ſtable dung and all enriching manures mixed with lime, or other active ſubſtances into the form of a compoſt, and in that ſhape employed, either as a top-dreſſing, or very near the ſurface, a much leſs quantity than is uſually applied, might probably be found ſufficient.

By laying manures upon or near the ſurface, they would ſink, by ſlow degrees, their beneficial effects would be exerted upon the plants in their paſſage downwards, and very little, if any, of them would penetrate deeper than they could be uſeful.

It is highly probable, therefore, though not yet fully aſcertained by experiments, that a much leſs quantity than what is uſually ploughed in, if applied as a top-dreſſing, would produce effects equal to thoſe ariſing from the preſent way of manuring.

But ſuppoſing that one half ſhould be required to produce the ſame effect, the benefit reſulting, even from this difference, will be ſtrikingly obvious. It will, no doubt, be ſaid, that additional labour will be requiſite to prepare and ſpread top-dreſſings; and that, after all, their effects will not be ſo permanent as in the common way of ploughing in the Manure. The objections, however, will, we truſt, have little weight. The firſt is, indeed, eaſily obviated; for if a quantity of Manure is made upon the farm yearly, and the whole of it be laid upon the ſoil, it is a matter of little conſequence whether it is ſpread upon one, two or three fields; the expenſe of carriage will be nearly the ſame in almoſt every inſtance, and the only difference will conſiſt in a ſmall additional outlay for ſpreading, which will require to be done with more attention when top-

dreſſings are employed, than when the manure is plowed in; of courſe leſs, will be ſpread in a given time and more hands will be required to ſpread it.

The objection to top-dreſſings not having permanent effects is, to appearance, better founded; and, certainly, at firſt ſight, moſt people would be inclined to ſmile at the idea of one cart load of manure producing as much benefit as two. But as we have formerly taken notice of the proportion of dung that is buried, and loſt, we need no further argument to prove that a half, properly prepared, and carefully applied, will be equally uſeful as double the quantity, differently treated. But allowing the objection to be ſolid, which is by no means the caſe, when we reflect upon the difference between manuring 50 acres or 100 annually, and take into account the increaſed produce in grain, and the increaſed bulk of ſtraw and fodder which is to form an additional quantity of manure for the enſuing ſeaſon, we ſhall be convinced that the advantage ariſing from uſing top-dreſſings, if judiciouſly followed, will be extremely conſiderable.

The only inſtance, in which the effects of top-dreſſings can poſſibly be leſſened, will be in dry ſeaſons, when a violent and long continued drought ſets in immediately after they are ſpread. This certainly is ſometimes the caſe; but, in general, the firſt gentle ſhower that falls inſures their operation.

Notwithſtanding the ſtriking advantages ariſing from an attention to theſe points, the ſubject of manures is ſtill conſidered by too many farmers as a ſecondary object; and much leſs care has hitherto been paid to collecting, preparing and employing them in a proper manner than they deſerve. A conſiderable quantity is daily loſt about every farm that might otherwiſe be ſaved, and a very great proportion of what is collected is of little value, owing to the careleſs ſlovenly manner in which it is treated.

In regard to the application of enriching manures, compoſts, and mixtures of ſoils, there are perhaps few

articles in which the huſbandmen are more deficient; while, at the ſame time, there is none to which ſo much attention is due.

DUNG OF QUADRUPEDS.

THE dung of quadrupeds is the moſt common, the moſt uſeful, though not, perhaps, the beſt managed of any manure that is at preſent known. Previouſly to entering upon the way of uſing it, we truſt a few obſervations upon the preſent defective mode of treating it, together with ſome account of its properties, the means of collecting, preſerving, and ſubjecting it to the proceſs of fermentation, and of increaſing its quantity, will be thought of ſervice.

Mode of management at preſent.—When any conſiderable quantity, either of ſtable dung, or mixture of animal and vegetable ſubſtances, are collected together, under certain circumſtances of heat, air, and moiſture, they begin to ferment and exhibit all the different phænomena of fermentation, in a greater or leſs degree, till the proceſs is finiſhed. If we then examine the maſs, we find that the vegetables of which it was originally compoſed, are decompounded and reduced to their firſt principles, and are again in a ſituation to afford food for new plants; by this means a perpetual ſucceſſion is kept up, and the decay or death of any of theſe, which at firſt ſight we might be led to conſider as a misfortune, ſerves for their reproduction.

This point ſettled, it will readily be admitted, that the more completely ſuch ſubſtances are ſubjected to the proceſs of fermentation, the greater and more beneficial their effects will be upon the ſoil. It is, therefore, an object of the firſt importance with every perſon concerned in the cultivation of the earth, to manage their Manures in ſuch a way that they may be completely fermented, and to have their dunghills ſo ſituated and conſtructed, as to promote fermentation, and preſerve the uſeful articles contained in the dung, both while the proceſs is going on and after it is finiſhed.

A careful

A careful attention to theſe points will not only improve the quality, but, as we ſhall afterwards ſee, increaſe the quantity of Manure in an aſtoniſhing degree.

When fermentation has taken place for ſometime in a heap of Manure, conſiſting either of animal or vegetable ſubſtances, or a mixture of both, the firſt alteration that is obſerved, is a change of color and a ſenſible diminution of its bulk; as the proceſs advances the bulk continues to diminiſh till the fermentation entirely ceaſes. This diminution is owing to the ſolid part of the maſs being brought more cloſely together, the fixed air and volatile alkali eſcape in the form of vapour, and the moiſture falls to the bottom, where it either remains, if the dunghill is ſituated in a hollow, and has a bottom capable of retaining the moiſture, or runs off if it is ſituated on a declivity. When this moiſture is collected and carefully analyzed, it is found impregnated with the ſalts contained in the dung, and if ſpread upon the ſoil in that ſtate, it will contribute to fertilize the land.

In collecting and preparing this Manure, little attention has, hitherto, been paid, either to the ſite of the dunghill, the encouragement of fermentation, or the preſervation of the ſalts after the fermentation is finiſhed.

Accordingly, we obſerve the greateſt part of dunghills, either ſituated in hollows, and ſurrounded with water, which by chilling the maſs very effectually prevents fermentation; or upon the declivities, where they are totally exhauſted of every drop of moiſture. In theſe caſes, the dung is thrown out careleſsly. Horſes, cattle, hogs, and poultry, are allowed to trample upon it and ſpread it, and even carts and waggons are drove over it.

By this treatment it is preſſed into a maſs, too heavy and compact for the air to penetrate through a great part of it, the ſides of the dunghill is ſcattered about, loſes its moiſture, and is either blown away by the winds, or returns to a ſtate little better than dry ſtraw,

and

and when the ſeaſon arrives for laying it upon the land, the whole is generally taken out, without conſidering whether it is fermented or not.

Defects of this management.—To a perſon who has paid any attention to the ſubject, the defects of this management muſt appear in a very ſtriking point of view. The middle of ſuch a dunghill, from being hard preſſed, will be long in fermenting, and even in the end be very imperfectly fermented, and the ſide, from being ſcattered about and dried, will not be fermented at all; we need hardly obſerve, that the conſequences of this management will be a ſcanty crop, and diſappointment to the farmer; this is the ordinary effect where dung is laid even upon a plain ſurface.

Bad effects of dunghills being placed in a hollow.—When the dunghill is ſituated in a hollow, and has a bottom capable of retaining moiſture, the conſequences are equally bad if not worſe. The whole of the rain that falls immediately from the clouds, together with the water from the roofs of the ſurrounding houſes, and the natural moiſture of the dunghill itſelf, lodge there and chill it ſo as to prevent fermentation. It is certain that ſtable dung, in ſuch ſituations, will have the appearance of being fermented, but, upon examination, it will be found only decayed; and from its being ſteeped ſo long in water, the greateſt part of the ſalts will be extracted, and what remains, if carefully analyzed, will be found to contain ſcarce any other principle but vegetable earth.

Loſs attending dunghills being ſituated upon a declivity, or a gravelly bottom.—When a dunghill is ſituated upon a declivity, or has a gravelly bottom, the loſs is equally great, as in the two former caſes; as the whole of the natural moiſture that is preſſed out during fermentation, and which is ſtrongly impregnated with the ſalts of the dung, either runs off or ſinks into the earth; nor is this the only loſs that is ſuſtained, every ſhower that falls, by paſſing through the maſs, carries off an additional quantity of the ſalts, till, by repeated

waſhings,

waſhings, the dunghill is left in nearly the ſame ſituation as tea leaves after a ſtrong infuſion has been drawn from them.

Finally, by throwing it out, in the careleſs manner already deſcribed, taking no pains to lay it up regularly, and allowing cattle, &c. to tread upon, and carts to paſs over it, fermentation is long in taking place; even then it is partial and incomplete, and in place of producing good Manure, abounding with rich, well-prepared ſubſtances, it will, for the moſt, be found to conſiſt of articles only half fermented, which, from their parts not being properly ſeparated, are very ill calculated to promote vegetation. Dung, is the moſt likely to be beſt, where the dung is upon level ground, and at ſome diſtance from the offices.

Having mentioned the preſent mode of collecting and preparing ſtable dung, and ſtated the ſlothful and defective manner in which it is generally done; we ſhall now proceed to offer ſome directions, as to the methods of promoting fermentation, and preſerving the ſalts after the proceſs is finiſhed; and laſtly, of increaſing the quantity of that valuable article.

To promote fermentation in Stable Dung.—To promote fermentation in ſtable dung, two things are eſſentially neceſſary, namely, air and moiſture; without theſe, no fermentation will take place, and unleſs they are in due proportion, the proceſs will be incomplete.

It is a circumſtance well known to perſons who are accuſtomed to prepare dung for hot-beds, that by laying it lightly together in heaps, and watering it gently, fermentation is immediately brought on. It is alſo known, that in the after ſtages of this buſineſs, hot-bed dung is as completely fermented in the ſpace of fourteen or ſixteen days, as that in a farm yard generally is in ſix or eight months.

Every farmer ought, therefore, to imitate this practice as nearly as the nature of his ſituation will admit, and in place of leaving his dunghill in the ſtable-yard, and allowing carts, cattle, hogs and poultry, &c. to trample

trample upon and diſturb it, he ſhould place it in ſome diſtinct ſituation, convenient for his offices, the urine from which ſhould run into receptacles, from which it ought be thrown without the trouble of carriage, into the dung, where it would be of the utmoſt uſe in promoting fermentation.

When it is driven to the dung-hill, the cart, or waggon, in which it is carried, ſhould not be drove over the dung, as is commonly practiſed; becauſe, as we formerly obſerved, the feet of the horſes and the weight of the carriage will preſs it ſo hard that the air will be in a great meaſure excluded, and by that means fermentation prevented.

The whole cart load ought to be laid down by the ſide of the dung-hill, and afterwards thrown lightly upon it with a fork, the trouble of doing which would be trifling, and the advantage immenſe.

If dung, laid up in this way, contains a ſufficient proportion of moiſture, it will immediately begin to ferment, and the proceſs will be ſoon and completely finiſhed; particular attention ought therefore to be paid to this circumſtance; and if at any time the dung is laid up dry, it ſhould be immediately watered. In ſummer this will frequently be found neceſſary, eſpecially during dry weather; and as moſt farms poſſeſs a ſufficient command of water, it can very eaſily be done.

Where this method is had recourſe to, the dung will be completely fermented in the ſpace of ſix or ſeven weeks at the utmoſt, and in general will be found of one half more value than that which is made in the careleſs, ſlovenly manner we have deſcribed.

Situation and Conſtruction of Dung-hills.—The importance of good manure to all agricultural operations is ſuch, that we ſhould naturally have expected to find every thing relating to it made a primary object with farmers. On the contrary no part of rural economy has been leſs the ſubject of inquiry. The ſituation and conſtruction of dung-hills, in particular, though highly deſerving notice, have for the moſt part been conſidered as a matter of indifference.

As was formerly mentioned, a hollow is improper for the ſite of a dunghill, from the circumſtance of its lodging water, and preventing fermentation; a declivity is equally bad, as it ſerves to drain and carry off the moiſture, ſaturated with the richeſt ſalts of the dung. A gravelly bottom is worſe than either of thoſe, as the moiſture ſinks down into the earth, and is irrecoverably loſt.

Proper ſituation for a Dung-hill.—The ſituation beſt calculated for the ſite of a dung-hill, is that which is neareſt to a level, with a bottom capable of retaining moiſture, and if poſſible covered with a ſhade. The whole ſhould be encloſed with a wall of at leaſt four or five feet in height, with an open ſpace at one end for carting away the dung. If the bottom is not clay, it ſhould be layed with it, and paved above, either with broad flags, or the common paving ſtones uſed for ſtreets.

To increaſe the quantity of Manure.—The quantity of manure may be increaſed in various ways, ſecuring the moiſture that drains from the dunghill, and either ſpreading it immediately upon the ſoil, or mixing it into compoſts.

The ſubſtances that have been found, from experience, beſt calculated to increaſe the quantity of Manure, are earth, moſs, turf, the ſhovellings of highways, and the cleaning of ditches or drains; one or all which may be found, in conſiderable quantity, upon every farm, if carefully ſought after. There are two ways of rendering theſe ſubſtances uſeful; the firſt is by laying them in the bottom of the dunghill, and ſuffering the moiſture of the dung to ſoak down, and ſaturate them; the ſecond is to lay them in heaps by themſelves, and collect the moiſture of the dunghill and the urine of the cattle, and pour it upon them; in either of theſe ways, if proper care is taken, any of the ſubſtances we have mentioned will produce effects equal to the beſt manure, and if the whole of the urine, and other excremental matters about every farm, is collected and uſed

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in this way, the quantity of that ſort of manure may be more than doubled in almoſt every inſtance.

Dung upon Clover Ley in Autumn.—The practice of laying dung upon clover leys in the autumn is abſurd; for whether it is intended to continue the field in clover for another year, or to plough it down for wheat or oats, the miſchief is great.

Where it is intended to let the field remain another year in graſs, a very material injury is ſuſtained, a part of the dung is, in the firſt inſtance, waſhed away by the winter rains, and the remainder, in place of ſerving, deſtroys the plants; it being now well aſcertained that the action of dung upon broad clover, where the plants are not in a growing ſtate, is fatal to them; in this caſe the farmer has the mortification of ſeeing not only his dung thrown away, but his crop loſt.

But while we reprobate the laying dung upon clover before winter, we entertain a very different opinion of it when uſed in the ſpring. At this ſeaſon a light top-dreſſing of dung is highly uſeful to broad clover, and, what is ſingular, the ſame plants, that would have been killed by its operation, if laid on about the end of autumn, will be rendered ſtrong and vigorous by uſing it in the ſpring: Let theoriſts account for this in their own way, the fact is incontrovertible.

Application of dung for turnips and potatoes.—Perhaps there is no way in which dung is uſed where its effects are ſo certain and viſible as upon potatoes, turnips and indian corn; the principal reaſon of this is the ſeaſon at which the dung is uſed; for potatoes, it is laid on when the ſpring is pretty far advanced, after which there are few heavy rains; of courſe the ſtrength of the dung is not impaired by waſhing, and the crop is left in quiet poſſeſſion of the whole of its fertilizing powers.

Theſe inſtances of the certain effects of dung, are mentioned merely with a view to ſhew the propriety of uſing it at a ſeaſon of the year when the crop, for which it is meant, is in a growing ſtate and can abſorb the uſeful parts of it. There is ſcarce a ſingle inſtance of its

failing (unleſs from bad ſeaſons) when applied in this way; on the contrary, when uſed in the autumn it is often loſt.

Dung upon meadows.—Farmers differ as to the proper time of laying on dung upon meadows. Some prefer the ſpring, producing, they aſſert, an early vegetation, and a plentiful crop. But others are of opinion that, though dreſſings of ſoot and fine aſhes, at that ſeaſon of the year, are of much uſe, yet that dung ought to be laid in the end of autumn, ſo as not to taint the juices of the enſuing crop, of which there is no danger unleſs it be uſed in too great a quantity.

Farmers ought to have ſeveral dunghills.—Perhaps there is nothing that calls more loudly for reform, than the cuſtom moſt farmers have of collecting Manure of every kind, and laying it up in one dunghill. By this mode of management ſubſtances very oppoſite in their nature, and which may be wanted at different times, are laid together, and in place of forming uſeful combinations, they are prevented from fermenting, and being rendered uſeful. We would, therefore, propoſe to every farmer to have at leaſt two or three dunghills, in which, according to the time at which the contents of each may be wanted, and the articles of which they are reſpectively compoſed, they may be prepared for uſe.

If earth, moſs, or the ſhovelings of highways, can poſſibly be procured, the bottom of any dunghill, in which either rank ſtable dung or ſhort excremental dung may be laid, ſhould be covered to the depth of three or four feet with theſe ſubſtances, before any of the dung is laid on. This method, if properly followed, will increaſe the quantity of Manure conſiderably, for, while the fermentation is going on, the moiſture that is preſſed out during the proceſs will ſink down into the earth, or moſs, and impregnate it completely with the ſalts of the dung; and if the whole is afterwards turned and incorporated, the earth or moſs that was laid on the bottom will be found of nearly equal value with the dung itſelf.

Some

Some diſtinctions are to be made regarding the various ſorts of animal dung.

1. Horſes. The dung of horſes is more diſtinguiſhed for the readineſs with which it ferments, than for its intrinſic richneſs. In its raw ſtate, it is well calculated for potatoes, leaving room in which the roots of that plant may expand, but, unleſs when fermented, it is apt to produce any ſort of weeds, the ſeed of which may have got into the food of the animal, as it contains much undigeſted vegetable matter, and ſhould never be uſed but when fermented.

2. The dung of cattle is the moſt uſeful, particularly for lean, dry, or ſandy ſoils. It is held that the dung of a ruminous animal, as an ox, is preferable to that of horſes at graſs, owing to the quantity of animal juices mixed with their food in chewing; not containing much undigeſted matter, it will hardly heat. It would be of uſe, if means could be found to make it ferment like horſe dung. The beſt way of managing it, is to lay it together, and keep it moiſt till it is ſufficiently putrified.

3. Sheep. The dung of ſheep by itſelf is an excellent Manure. In *Holland* it is collected on the fields, carefully cut into pieces and ſold in baſkets at a high price.

4. Hogs. Swine's dung in the opinion of Dr. Hunter, is the richeſt of the animal Manures. It is commonly aſſerted, that the fatter the animal, *cæteris paribus*, the richer the dung. Hence ariſes the ſuperiority of this article. It is of an oily and ſaponaceous quality, and when made into a compoſt, and applied with judgment, it is excellent for arable lands.

II. *DUNG OF BIRDS.*

PIGEON's dung is certainly a rich Manure, but the effect is ſudden, and as it does not laſt long, it muſt be the oftener renewed. It is moſt applicable to cold and deep ſtiff land. Sometimes it is ſown upon wheat crops in the ſpring. It ſhould always be broke very ſmall, and ſown during moiſt weather, and if circumſtances

ſtances will admit of its being harrowed in, ſo much the better. Poultry Manure is of the ſame nature, and where it can be had in any quantity, is an excellent dreſſing, particularly for cold land. Columella ranks it next, in point of value, to the dung of pigeons.

III. *NIGHT SOIL, OR PRIVY MANURE.*

ALL excremental matters are found to be excellent Manures, and if care were taken great quantities might be collected.

As it is perhaps the richeſt of all Manures, there can be no doubt of the farmers being deſirous of obtaining it; but on account of its richneſs, it ought to be uſed, when unmixed, in ſmaller quantities, at leaſt a ſmall quantity of lime thrown occaſionally into the neceſſary houſe would be of great ſervice. Saw duſt, peat moſs, or any of the common ſoils, will likewiſe be highly uſeful, by abſorbing the urine and moiſture, which would otherwiſe run off into the common ſewer. Where a certain proportion of lime is uſed, the excremental part will ſoon be deprived of its ſmell, and rendered ſo ſhort and dry that it may, with eaſe, be employed as a top-dreſſing, or even uſed by the hand if properly broke; indeed it ſhould never be employed in any other way, as it is by far too concentrated a nouriſhment to uſe by itſelf.

Two cart loads of ordure, mixed with ten loads of earth and one of lime, will be a ſufficient top-dreſſing for an acre; its beſt effects, when uſed in this ſhape, will be upon light lands for wheat or barley; for wheat it ſhould be uſed early in the ſpring, and for barley ſhould either be ſcattered upon the young crop, or harrowed in with the ſeed. It is alſo particularly convenient for all drill crops.

IV. *URINE.*

URINE of every ſort is found of great uſe when laid upon graſs or young crops early in the ſpring. Applied in this way, it never fails to produce a plentiful and early

early vegetation. The moſt convenient way of uſing it, however, ſeems to be in the form of a compoſt, with earth, or peat moſs, with a ſmall proportion of lime. In this ſhape it will be found a good Manure for moſt ſoils, particularly light, ſandy, or gravelly lands.

Great quantities of this article might be ſaved, and if judiciouſly uſed, will inſure at leaſt one or two crops; about all farms and great towns it may be collected into reſervoirs, along with other excremental matters, with very little trouble. In other countries this is an object of police, particularly in towns where reſervoirs are eſtabliſhed in convenient places for collecting it. It is ſcarcely conceivable the advantage which the public receives from this arrangement. The neighbouring farmers carry it away in barrels, and either ſpread it immediately upon their fields, or mix it into compoſts, with earth and other ſubſtances, and find it of the utmoſt ſervice to vegetation. What might not be expected if the ſame attention was paid to collecting it over the whole kingdom?

V. *BONES.*

BONES are uſed with ſucceſs as a Manure in many parts of *England*, both by themſelves and in conjunction with many other ſubſtances. The ordinary way of treating them, is to break them with a mill into pieces about the ſize of a marble; they are afterwards laid upon the field in ſmall heaps, at regular diſtances, and covered with earth, after remaining in this ſtate for ſome time, they are ſpread on fallows, on graſs and on turnip land.

Method of preparing bones previous to their being uſed. To render bones uſeful, the firſt ſtep ought to be to grind them as ſmall as poſſible, and the more thoroughly this operation is performed the more valuable will be their effects.

VI. *PUTRID*

VI. *PUTRID ANIMAL SUBSTANCES.*

ALL animal ſubſtances in a putrid ſtate, are good Manures, if properly managed; when uſed by themſelves they ought always to be laid upon the ſharpeſt and moſt active ſoils, ſuch as chalk, limeſtone, &c. but upon ſtrong clays or deep loams, they ſhould never be uſed but in the form of a compoſt.

Method of preparing putrid ſubſtances for Manure.—The moſt proper method of preparing theſe for uſe is by mixing them with chalk or quick lime, the mixture ſhould be laid in heaps of three or four cart loads each, and covered with earth; after remaining in this ſtate for eight or ten days, the heap ſhould be turned over, and about ten cart loads of earth added to every cart-full of the former mixture. It ſhould then be allowed to remain for a month in this heap, at the end of which time it will be ready for uſe.

Modes of applying this compoſt.—This compoſt ought never to be ploughed in, but always uſed either as a top-dreſſing, or harrowed in along with the ſeed. Upon wheat in the ſpring it will be found a good manure; indeed upon every ſort of grain it may be uſed with ſafety and advantage. It may likewiſe be uſed for drill crops in the ſame manner as was mentioned for bones.

VII. *REFUSE OF SHAMBLES.*

MUCH of this Manure might be collected about all great towns, where the refuſe of ſlaughter-houſes is frequently thrown away; which, if gathered together and covered with earth and lime, would not only rid the inhabitants of a nuiſance, which offends their ſenſes and endangers their health, but would produce profit to the community.

FISH.

ALL kinds of fiſh in a recent ſtate, contain nouriſhing ſubſtances in conſiderable quantities, and upon particular

particular occaſions, either where the quantity caught has been too great for the market, or where there has been a deficiency of ſalt for curing them, they have been occaſionally employed as Manures, even in caſes where the fiſh has been cured: the offal is worth attending to, as it poſſeſſes a conſiderable proportion of nutritive principles; but whether the whole of the fiſh or only the offal is employed, the management will be the ſame, as both poſſeſs too much oil to be uſeful as Manures without the addition of ſome active ingredient.

The proper way of uſing fiſh, ſeems to be that of mixing them into compoſts with other ſubſtances. For that purpoſe we are convinced that laying them in heaps for eight or ten days, till they begin to corrupt, and then mixing them with a quantity of earth is beſt; when they have remained in this ſtate for a couple of weeks, the heap ſhould be turned, and a quantity of chalk or quick lime, added in the proportion of one cart of lime to three fiſh; this ſhould be allowed to remain for a month, and then turned, and as much earth added as will be equal to both fiſh and lime. Herrings being the fiſh that is caught in the greateſt abundance, will be moſt frequently uſed in this way, either entire, or their offal; in theſe ſituations, therefore, where they are in greateſt abundance, it is of conſiderable importance to be able to uſe them to advantage.

A compoſt, prepared in this way, will be found an excellent top-dreſſing for any ſort of crop, if applied at a proper ſeaſon. For wheat, if uſed early in the ſpring, it will anſwer well; or for barley either harrowed in with the ſeed, or applied upon the young crop. It may likewiſe be uſed for drill crops with great eaſe and accuracy.

SEA WEED, OR WARE.

SEA WARE is uſed as a Manure upon almoſt every part of the coaſt where it can be obtained in ſufficient quantity; and wherever the practice prevails, its effects are diſtinctly marked by producing early and luxuriant crops. The

The common practice is to ſpread the weed immediately after it is brought from the ſhore, either upon the ſtubbles or graſs lands. When laid upon the ſtubbles, it is generally ploughed in as ſoon as poſſible after ſpreading; farmers who uſe much of it, never lay it in heaps to ferment, as they obſerve, that both the quantity and quality are impaired by treating it in this way, ſo much ſo indeed, that a load of freſh ware will be of more ſervice, if laid upon the ſoil immediately after it is thrown out by the tide, than two loads when laid in a heap, and left to ferment. In this reſpect ſea ware and all marine plants differ from moſt vegetable and animal Manures; to render the latter completely uſeful, fermentation is indiſpenſable; the former, on the contrary, producing the greateſt benefit in its recent ſtate.

RIVER WEED.

RIVER WEED has hitherto been little uſed as a Manure, though ſome experiments that have been made entitle it to conſiderable notice.

Its effects upon wheat and the different ſorts of grain, as well as upon turnips, cabbages, and other tops, are well aſcertained, and the facts ſtated ſo ſtrong as to awaken the attention both of farmers and proprietors, who have either rivers or lakes upon their lands.

In ſummer great quantities may be gathered, both in the caſks and thoſe parts of rivers where the water is deep, and has no current, and in all wet ditches. This article is uſed in various ſhapes, ſometimes it is laid upon the land green, and ploughed in, at other times it is mixed with earth and dung. Its effects, when ploughed in green, laſt only one year, but when uſed as a compoſt, along with other ſubſtances, they are more permanent.

The beſt way of preparing it for a manure is to lay it in ſmall heaps for a day or two after it is taken out of the water, in order to drain off the ſuperfluous moiſture; for if it contains too much of that, it will not readily

readily ferment, and when fermentation does take place, a conſiderable proportion of its uſeful parts will be waſhed away; having lain two or three days in this ſtate, it ſhould be put in large heaps, containing three or four cart loads each, and ſuffered to remain there till the fermentation is over; each heap ſhould then have about three times the quantity of earth or mud mixed therewith, taking care to incorporate them well, and let them remain for a week or ten days; they ſhould then be turned, and a quantity of hot new ſlacked lime added, during the turning. This compoſt may be made ready for uſe in a month.

This Manure ſeems well adapted for thin light ſoils, upon which it will always operate well, and from the quantity of rich vegetable which it contains, will thicken the ſtaple of the land. Indeed it will be found valuable upon whatever ſoil it is laid, but ſhould never be uſed in any other ſhape than as a top-dreſſing.

MUD.

Mud, whether from the ſea, rivers or ponds, is an excellent Manure, and is uſed with much advantage upon all ſoils, both in its ſimple ſtate, and in conjunction with lime and other ſubſtances. Its great value is upon thin ſoils, the fertility of which it increaſes amazingly, and, at the ſame time, adds to the ſtaple of the land. Much of this Manure may be collected in the deep parts of rivers, in ponds, and in all ſtagnant waters; in particular ſituations great quantities of it are depoſited by the tide, particularly where the ſea has an ouzy bottom near the ſhore. In peruſing the Agricultural reports, ſeveral inſtances of the valuable effects of ſea ouze or mud, are mentioned from high authority.

This article, whether collected from ponds, rivers, or the ſea, ſhould always be made in compoſts, either with lime, chalk, or marl, or with lime and dung, if they can be procured; and on no account ſhould they be applied any other way, but as top-dreſſings, or very

near the ſurface. For wheat, barley and clover crops, it is highly ſerviceable, and has alſo been applied with ſucceſs upon thin paſtures.

SWEEPINGS OF STREETS.

THE value of this Manure is well known to farmers in the neighbourhood of great towns, who pay large ſums for it yearly.

This Manure conſiſts of a mixture of all thoſe ſubſtances that are valuable in agriculture, and needs the aſſiſtance of fermentation leſs than any of them, to render it fit for uſe, as it is made up principally of the offal of houſes, dung of horſes and cattle, aſhes, and other active materials, that render it immediately uſeful. From a knowledge of the nature of it, we think it ſhould never be ploughed in deep, but always applied upon, or near the ſurface. In ſome inſtances, where it has been uſed in this way, its effects have been wonderful, from the ſlight coheſion of its parts it is excellently adapted to this ſort of huſbandry, and may, likewiſe, be put into the furrow with drill crops with great care.

EARTHS, AND EARTHEN OR MUD WALLS.

IT is found by experience, alſo, that walls of mud or earth, erected for the purpoſe of confining cattle in a fold, or by way of fence, acquire great fertility. Some aſſert, that ſuch walls are enriched by the nitrous particles they attract from the atmoſphere; and others, that they are ameliorated by the froſts (in conſequence of the influence of which, the ſides gradually moulder down,) or from the vegetable fibres putrifying. Though perhaps not rich enough to be uſed by itſelf, there cannot be a better article for a compoſt.

MALT DUST, OR COMB.

THIS is reckoned one of the moſt efficacious of all Manures. It is the duſt which ſeparates from the malt, in the act of drying.

TANNERS'

TANNERS' BARK.

SOME writers on agriculture have recommended tanners' bark as a Manure. In its raw ſtate it is not likely to be of much ſervice, but from ſome experiments made by the celebrated John Hunter, it certainly in proceſs of time is converted into vegetable mould. When it becomes rotten, and is ſpread pretty thick, it has been found of great uſe to graſs ground. But the moſt likely mode of rendering it uſeful, is that of mixing it with lime, or perhaps with ſalt, by which it ſoon becomes converted into a valuable article. This plan may alſo be extended to other vegetable ſubſtances.

An intelligent agriculturiſt recommends the following plan for uſing this article. After it is taken out of the tan-pit, and thoroughly waſhed, mix it with an equal quantity of freſh horſe-dung, including the litter, and cover it from rain, but let the whole be kept moiſt. When the heat has gone off, it ſhould be mixed with a freſh quantity of horſe-dung, and the heat renewed; when the heat is gone off, the whole being made into a compoſt with chalk, will form as enriching manure as can be procured.

SOOT.

SOOT is uſed as a manure (in almoſt every part of the iſland) where it can be procured in ſufficient quantities, and is applied in every different ſhape, and to all the different crops. Uſed in its ſimple ſtate, it anſwers beſt upon light gravel, chalk, or limeſtone ſoils; if in a compoſt, the proper proportions are, two loads of ſoot, the ſame quantity of lime, and ten loads of earth. The ſoot and earth ſhould be well incorporated, previous to the application of lime, and allowed to remain in a heap a week or ten days, then turned, and the lime added in regular ſtratums as it is turned over; in this ſtate it may remain for a month or ſix weeks, and be again turned, taking care to break every part of it as ſmall as poſſible, by working it well with the ſpade, in a week or two more it will be ready for uſe.

The

near the ſurface. For wheat, barley and clover crops, it is highly ſerviceable, and has alſo been applied with ſucceſs upon thin paſtures.

SWEEPINGS OF STREETS.

THE value of this Manure is well known to farmers in the neighbourhood of great towns, who pay large ſums for it yearly.

This Manure conſiſts of a mixture of all thoſe ſubſtances that are valuable in agriculture, and needs the aſſiſtance of fermentation leſs than any of them, to render it fit for uſe, as it is made up principally of the offal of houſes, dung of horſes and cattle, aſhes, and other active materials, that render it immediately uſeful. From a knowledge of the nature of it, we think it ſhould never be ploughed in deep, but always applied upon, or near the ſurface. In ſome inſtances, where it has been uſed in this way, its effects have been wonderful, from the ſlight coheſion of its parts it is excellently adapted to this ſort of huſbandry, and may, likewiſe, be put into the furrow with drill crops with great care.

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The advantage of preparing ſoot in this way is too obvious; by mixing it firſt with the earth, the operation of the lime is prevented from being too ſevere, and when the diſſolution of the ſoot does not take place, it goes on gradually, and every part of it is abſorbed and retained by the earth with which it is mixed. The lime and volatile alkali will unite and form a cauſtic volatile ſalt, which will completely diſſolve and ſeparate the oily particles, and render them miſſible with water; and the compound, thus prepared, will conſiſt of rich nouriſhment for plants. This compoſt may be employed upon every ſort of grain, eſpecially for wheat or barley, and if rain fall ſoon after it is laid on, it will immediately begin to operate.

It ſeems to be a matter of no very great conſequence, whether it is harrowed in with the ſeed, or uſed as a top-dreſſing upon the young crop, without harrowing: For wheat, it certainly ſhould be preſerved till the ſpring, as if it is uſed before winter, the greateſt part of it will be waſhed away, before the plants have any occaſion for it. The only riſk that attends uſing it as a top-dreſſing, without harrowing it, is, when dry weather immediately follows; when this happens, part of it will be loſt, and the remainder, aided by the heat of the ſun, may prove detrimental to the tender plants. By harrowing it in with the ſeed this evil will be avoided, as it will then be incorporated with the ſoil, which will both prevent the volatile parts from being exhaled, and the heat of the compoſt from doing any injury to the tender plants. When ſoot is ſown by the hand, equal parts of ſoot, lime, and mould ſhould be uſed, always taking care to mix the ſoot and earth firſt, and to apply the lime in as active a ſtate as poſſible.

PEAT MOSS.

MOSS being a vegetable production, it is reaſonable to ſuppoſe that it may be converted into a Manure; for this purpoſe, many attempts have been made, but all of them have hitherto proved abortive, from the difficulty

difficulty of ſubjecting it to the proceſs of fermentation; by which means a ſubſtance, containing nearly one half of its weight of the fineſt vegetable mould, together with a great proportion of oil and other principles, has not only remained uſeleſs, but has been conſidered a nuiſance.

A knowledge of the properties of the animal and vegetable ſubſtances, informs us, that they are more or leſs liable to putrefaction, according as they contain more or leſs of an acid or alkali in their compoſition. If the acid prevails, putrefaction takes place ſlowly, and with difficulty; but if the alkali prevails, putrefaction takes place very ſuddenly. The analyſis of peat moſs demonſtrates that it contains an acid, in moſt caſes nearly in the proportion of one fourth of its weight. Its other conſtituent parts are oil, alkaline ſalts, and vegetable earth; theſe three laſt principles are known to be highly uſeful in vegetation, but when combined with an acid, their valuable qualities are not only locked up, but the whole maſs is prevented from fermenting, by which proceſs alone it can be rendered uſeful.

In conſidering this matter attentively, three queſtions ariſe, the firſt is;—Can the acid moſs be corrected? The ſecond; will it then be ſuſceptible of fermentation? The third, and moſt important queſtion of the three; will it then be a good Manure? and can it be prepared at a reaſonable expenſe? All of theſe queſtions we are able to anſwer in the affirmative:—The acid can be corrected at a trifling expenſe; when that is accompliſhed, moſs, being a vegetable ſubſtance, will ferment in nearly the ſame circumſtances as other vegetables do, and the produce will be equally valuable as a manure. All this can be accompliſhed with ſmall trouble, and at an expenſe trifling indeed, when compared to the advantage reſulting from it.

Every one acquainted with chemical affinities, knows that acids unite with alkaline ſalts and abſorbent earths, in preference to every other body; nay, ſo ſtrong is their attraction for theſe, that when they are found joined

joined to any other ſubſtance, they immediately quit that, and unite with them; for inſtance, if a compound, conſiſting of an acid and a metal, has an abſorbent earth, or an alkali preſented to it, the acid ſeparates itſelf from the metal, and joins the alkali or abſorbent earth. Alkaline ſalts and calcareous, or abſorbent earths, are, therefore, the proper correctors of moſs, and if applied with judgment, will anſwer that purpoſe very effectually. Having advanced this opinion, we proceed to deſcribe the different ways of preparing moſs for a manure.

Method of preparing Moſs for a Manure.—1ſt. Lay moſs that has been well dried,* to the thickneſs of three or four feet in the bottom of a dunghill, let the whole of the dung from the ſtables be laid above it, and ſuffered to ferment there. During the proceſs, the natural moiſture of the dung will ſink down, and not only correct the acidity, but ſaturate it completely with the valuable properties of the dung. In this ſtate it is ready for fermentation. This method of preparing moſs, on account of the eaſe with which it is performed, will generally be preferred, and perhaps there is no way in which it can be done with equal advantage, as the acidity is not deſtroyed, and the moſs filled like ſponge with rich materials, but the dung will aſſiſt in ſubjecting it to fermentation. While it remains at the bottom of the heap, however, it will not ferment, the weight of the dung, and the moiſture it contains, being inſuperable obſtacles to the proceſs.

In this ſtate of things the dung-hill ſhould be turned over, and the dung and moſs carefully mixed during the operation; if this is properly done, and the whole thrown up lightly together, a gentle fermentation will ſoon come on, and of this ferment the moſs will partake. After remaining in this ſtate for a few weeks, it ſhould again be turned, and a quantity of lime added, in the proportion of one load of lime to five loads of

* Unleſs moſs is properly dried, and broke ſmall, previous to its being mixed with other ſubſtances, every attempt to correct its acidity, or render it uſeful, will be abortive.

of moſs; the whole ſhould be well broke, and accurately mixed, the addition of the lime will accelerate the putrefaction of the moſs, diſſolve the oil contained in it, and give a due degree of activity to the whole.—

2d. When it is preferred to lay the moſs by itſelf, the whole urine of the cattle, moiſtue of the dung-hill, ſoap ley, and offal of the houſe, ſhould be poured upon it, and if this is carefully done, the effect will be nearly the ſame, as when the moſs is laid in the bottom of the dung-hill; in this caſe the acidity will be completely deſtroyed, and if it is afterwards mixed with ſtable dung and lime, it will be equally valuable.

3d. The laſt way of rendering moſs uſeful, is by mixing it with pot-aſh, kelp, lime, or chalk.

In the diſtant parts of the country, where moſs abounds, and other Manures are obtained with difficulty, this is, perhaps, the moſt uſeful way of any. When pot-aſh is made uſe of, the quantity required to correct the acidity of moſs, and render it ſuſceptible of putrefaction, is ſo ſmall, that it can eaſily be obtained; eighty or one hundred pounds weight, if properly uſed, will be quite enough for ſaturating a quantity of moſs ſufficient for an acre; indeed, if the moſs is completely dried, much leſs will ſuffice.

The principal points to be attended to in preparing all the compoſts are:

1. To dry the moſs ſufficiently.
2. To break it as ſmall as poſſible.
3. To incorporate other ſubſtances well with it.
4. To allow it to reſt a ſufficient time after each turning.

Method of uſing moſs as a Manure.—Upon thin gravels, or ſharp active ſoils, ſuch as chalk or limeſtone, the effects of moſs, prepared in any of theſe ways, will be found highly beneficial, not only as a Manure, but alſo for thickening the ſoil. It will likewiſe be of ſervice for thin clays. Upon deep clays its effects will not be ſo ſenſibly felt, as theſe ſoils contain in themſelves a ſufficient quantity of the principles with which moſs abounds, namely, oil, and vegetable earth.

Every

Every farmer in the upland ſhould have three heaps of moſs in a ſtate of preparation, viz. one in the bottom of his dunghill, another upon which the urine of the ſtables, together with the ſoap ley and offal of the houſe, is poured; and a third, to mix with pot aſh and lime, &c. &c. By theſe methods, and at a very inconſiderable expenſe, five or ſix times the quantity of Manure that is uſually made, might be procured, the produce of which in grain, and the increaſed quantity that would every year ariſe from the additional quantity of ſtraw, would bring the cultivation of theſe parts to as high a pitch of perfection as they are ſuſceptible of.

Some farmers may be induced to think that ſuch minute attention to matters of this ſort is unneceſſary, and that the advantage ariſing therefrom will not compenſate for the labour that is beſtowed upon them; but we hope the intelligent part of that claſs of men will readily ſee, and be convinced of the utility of it. In the ſingle article of the offal of a farm houſe, whoever conſiders the immenſe quantity of urine, ſoap ley, dirty water, and other excremental matters, that are daily thrown away, careleſsly about every farm houſe; all of them impregnated either with oil or alkaline ſalts, will at once perceive the value of them when collected for a whole year. To do this effectually, no way ſeems ſo proper as pouring them upon moſs, earth, or ſuch ſubſtances as will abſorb and retain them.

This account of the properties of moſs, is not founded in conjecture or idle ſpeculation, but proceeds upon a correct knowledge of its conſtituent parts, obtained by a careful analyſis, and from repeated trials of its effects, both by mixing with dung, urine, pot aſh, and lime, all of which have been completely ſucceſsful.

PLOUGHING IN OF GREEN CROPS.

AS all vegetables afford, in different proportions, Manure of conſiderable value, the practice of ploughing in green plants, for the purpoſe of enriching the ſoil,

ſoil, is extremely ancient, and in particular is recommended by all the Roman writers on huſbandry.

Peaſe, beans, buck wheat, turnips, and other moiſt and juicy plants, if ploughed in when in full bloom, at which time they abound moſt in ſap, yield a valuable Manure; this mode of fertilizing the ſoil is leſs practiſed than it deſerves.

When it is conſidered at what ſmall expence of prime coſt, carriage, and other charges, this ſpecies of Manure is obtained it is to be wondered at, that it has not been more generally adopted. It is of all others the moſt œconomical, and might, no doubt, be uſed on many occaſions as a preparation for a crop of wheat; in which caſe the price of the ſeeds, which is almoſt the only expenſe, would be amply repaid by the ſaving that would take place in the article of labour.

The ploughing down green crops might be much improved, by laying on a certain quantity of lime, chalk, or marl, according to the nature of the ſoil, which would tend greatly to haſten the fermentation of the green crop ploughed in, and bring the land ſooner into a proper ſtate to afford nouriſhment to the ſucceeding crop of wheat.

DECAYED VEGETABLE SUBSTANCES.

IT is certain that decayed vegetables are of uſe as a Manure. Some probably are of little more uſe than common earth or mould; but others have ſaline, oily, and other particles in them, of conſiderable value. Mortimer reckons the rotten wood of hedges and coppices, to be a great improver of the ſoil where it drops, and inſtances the earth where faggot piles have been uſed to ſtand. All ſuch ſubſtances may be added to ſtrong heating dunghills.

Leaves of trees have been found to anſwer as a Manure for potatoes. They ought to be carefully gathered at the fall, and formed into a heated dunghill.

BURNT LIMESTONE.

THE effect of lime and other calcareous ſubſtances, upon vegetation, is, perhaps, one of the moſt valuable and extraordinary diſcoveries that Agriculture has to boaſt of. It is hardly poſſible for the wildeſt imagination to conceive a propoſition apparently more abſurd, than that of taking a piece of the hardeſt ſtone or marble, burning it till completely calcined, throwing cold water upon it, with a view of reducing it to a white powder, and expecting, from the effect of that powder when mixed with the ſoil, a luxuriant crop of grain, of graſs or other vegetable production; and yet, when properly applied, the effect is unqueſtionable.

The beneficial effects of lime, in particular, either when applied alone or uſed in conjunction with other ſubſtances, entitle it to the higheſt notice. Many different and even oppoſite opinions, have been entertained upon the manner in which it operates, few of which are completely ſatisfactory. It is known, from experience, to produce bulky luxuriant crops upon lands formerly of little value; but from the barreneſs that frequently ſucceeds theſe bulky crops, lime has been thought dangerous, by ſtimulating the ſoil overmuch. Indeed if great care is not taken after a few exhauſting crops, it will be in a worſe ſituation than it was before the application of the lime.

The principal points to be attended to in the lime huſbandry are the following:

1ſt. To aſcertain the quantity proper for each ſoil.

2d. The mode of applying it ſo as to inſure the utmoſt benefit from its uſe.

3d. The way of preparing it previouſly to its being laid upon the ſoil.

The proper rotation of crops to be afterwards followed, ſo as to preſerve the land in a ſtate of fertility.

With regard to the firſt of theſe points, viz. the quantity neceſſary for the different ſoils, we cannot, in a work

work like the preſent, preſume to fix it, as that can only be determined by experiments carefully made. In general, however, it may be obſerved, that the greateſt quantity of lime ſhould be uſed upon the deepeſt and richeſt ſoils, and the leaſt upon thoſe that are thin and light; leſſening the quantity gradually from the ſtrongeſt clay to the lighteſt gravel. Intelligent farmers will at once obſerve the juſtice of this remark. Upon ſtrong clays and deep loam there is a ſubſtantial body for the lime to operate upon, containing an abundance of rich ſubſtances, and conſequently a conſiderable quantity will be required to pervade and give due activity to the whole; but in proportion as the ſoil grows lighter, the quantity employed muſt be leſs, and the after management, with regard to crops, extremely cautious. In ſhort, the moſt trifling difference in the qualities and conſiſtency of the ſoil, ought to be a matter of ſerious conſideration with the huſbandmen, gradually leſſening or increaſing the doſe, as circumſtances may require. In liming a ſingle field this attention will often be found neceſſary, particularly if the ſurface is unequal. The ſoil of the higher parts will, for the moſt part, be found free, while that of the lower is deep and compact. It is obvious, that if a field of this deſcription is limed, and the ſame quantity laid over the whole; if the quantity is ſmall, the higher parts only will be benefited, while the ſtrong deep land will ſcarce receive any advantage. On the contrary, if the quantity is great, the higher land will be over limed, while that below will hardly have enough, To ſome farmers theſe may be thought nice, perhaps trifling diſtinctions; but we truſt by every judicious man, they will be conſidered as important. It is ſeldom that we have ſeen ſufficient attention paid to this circumſtance; on the contrary, be the difference of the ſoil what it will, and in large fields it is often very great, we, for the moſt part, ſee the ſame labour beſtowed, and the ſame quantity of lime and other Manures laid over the whole. The conſequences attending ſuch management do not require to be pointed out.

We

We cannot take leave of this part of the ſubject, without earneſtly recommending it to every farmer, to make himſelf thoroughly acquainted with the nature of his land, before he ventures upon the uſe of lime. On ſome ſoils he will find it totally inadmiſſible, particularly where the bottom is chalk, limeſtone or marl; in all of which it will be pernicious, eſpecially if the ſoil is thin. In ſuch ſituations, a judicious farmer, in place of laying out his money upon lime, which will not only be loſt, but do miſchief, will employ it in purchaſing enriching Manures, which will afford him an ample return.

It is cuſtomary, in many places, firſt, to dreſs their fallows with lime and plough it in; afterwards, to manure with dung, and plough it in alſo. For this practice no ſufficient reaſon is aſſigned; indeed it will be difficult to give one; for if the ſoil ſtands in need of lime, the dung is unneceſſary; or if the field has been formerly limed, and the operation of the lime is intended to be principally exerted upon the dung, the deſign is fruſtrated by its being previouſly mixed with the earth. In all caſes, where lime and dung are employed upon the ſame field, they ought either to be uſed by way of a compoſt, or laid on at the ſame time. In either of theſe caſes, the operation of the lime upon the dung will be, in a great meaſure, inſured. In the former, it will be completely ſo; and perhaps experience will prove this to be one of the beſt ways of uſing it. In the latter, though the lime will have a greater effect upon the dung when they are laid on at the ſame time, and ploughed down together, yet it is utterly impoſſible, even in this way, to bring them ſo completely into contact with each other, as to produce the utmoſt benefit that might be expected from their union. Few arguments will be neceſſary to prove, that this is only to be done by incorporating them thoroughly previouſly to their being laid upon the field.

We have already taken notice of the neceſſity of fermentation to common ſtable dung or litter, and are perfectly

perfectly ſatisfied that any thing produced in the ſtables will be very unfit for uſe in the ordinary way of farm-yard management, in ſo ſhort a ſpace as a month or ſix weeks. It is, however, certain, that conſiderable quantities are every year led out freſh from the ſtables, and employed in this diſgraceful way.

Inſtead of hurrying it to the field, in this raw, unfermented ſtate, if farmers would be at the trouble of making three or four dung-hills in place of one, the dung would not only ſooner ferment, but they could, with little labour and without any loſs, fix upon the dung-hill that was beſt fermented and uſe it, either by itſelf, or in conjunction with earth, mud, &c. and leave what was made laſt till it was fit for uſe. By this management the whole manure upon a farm would be completely fermented, and no part of it loſt.

Indeed, we have long entertained an opinion, in which, we believe, many experienced farmers will agree, that a very great proportion of all the dung that is laid upon wheat lands, is loſt by the winter's rains; for if the dung has been properly prepared, every winter ſhower that falls will carry away ſome of the ſalts from the ſoil; and when the ſpring arrives, a great part of the food of the plants will be found to have periſhed during the winter; whereas, were the application of the dung deferred till the ſpring, when the growth of the plant commences, we can readily underſtand what becomes of it; the wants of the crop would take up all the rich parts after every ſhower, and their progreſſive increaſe would conſtantly demand a new ſupply; ſo that every part of the nouriſhmeut would be properly applied. On the contrary, as we have already obſerved, when the manure is laid on in autumn, it is expoſed to the continual waſhings of the winter's rain, and at a time too when it can be of very little ſervice to the plants; for wheat, like every other ſeed that is ſown in autumn, if it vegetates and eſtabliſhes itſelf in the earth before winter, does all that can be expected. During the winter it makes no progreſs,

conſequently

conſequently needs no aſſiſtance from the ſoil; and as we ſhall immediately obſerve, its chance of remaining in the ground is greater where no manure is uſed, than where it is. The effects of lime, and all manures, is to open the ſoil during winter, particularly where much ſtable dung has been uſed; and as the plants make no progreſs during that time, ſo every thing that opens the ſoil, and expoſes the roots to the cold, muſt be hurtful; and if to the injury of opening the ſoil, we add the loſs that is ſuſtained by the ſalts of the manure being waſhed away and loſt by the rains, we ſhall readily be convinced, that the application of the dung in autumn upon fallows with lime, is very often thrown away. Indeed in caſes where dung is uſed by itſelf upon fallows, the application of this maxim is equally proper, as the beſt ſalts of ſtable dung are nearly as periſhable, when applied by themſelves, as in conjunction with the lime. Top-dreſſing in the ſpring, will therefore be proper in this caſe alſo, though it will certainly have a greater effect, when lime has been ploughed into the fallow; in that caſe, while the lime is ſtimulating and acting upon the principles of the ſoil, the juices of the dung will be gradually ſinking down, and at once correct the hot cauſtic effects of the lime, and afford nouriſhment for the crop.

Lime as a top-dreſſing upon young crops.—With regard to the application of lime, as a top-dreſſing for broad clover, &c. we entertain nearly the ſame opinion of its effects, as for young crops of grain *(vide experiments.)* If it is more uſeful upon one ſort of ground than another, it will certainly be upon coarſe meadows. Upon land of this deſcription, abounding with ruſhes and other uſeleſs plants, it is highly proper; but in theſe ſituations it is the inſtrument of death; for it is well known that the coarſe herbage in meadows, is entirely deſtroyed by a complete liming. Whether this effect is produced by the lime deſtroying the plant, or by its altering the nature of the ſoil, ſo much as to render it incapable of nouriſhing ſuch herbage in future, may

be

be difficult to determine. Perhaps the laſt will be found the true cauſe.

Upon ſuch grounds, therefore, the effects of lime, as a top-dreſſing, will be highly beneficial ; and this benefit will be ſtill further increaſed, if the meadow is capable of being ploughed ; for though lime may be inimical to ruſhes and other coarſe plants, even in a growing ſtate, it will be ſtill more ſo when their connexion with the ſoil is deſtroyed. To ſummer plough theſe meadows, therefore, ſeems to be the proper plan, and after they have remained for ſome time in that ſtate, to croſs plough and expoſe them to the winter's froſt, then to lay on the lime, and harrow it till the ſoil is completely reduced, and the lime incorporated therewith.

It has been obſerved, that lime, both alone and in conjunction with alkaline ſalt, has the power of uniting with all oily and fat ſubſtances. Now, as all the ſeeds and plants with which we are acquainted, contain more or leſs oil, lime will have a proportionable effect upon them. Lime, alſo, properly acts by killing inſects, as well as deſtroying vegetables, which thus furniſh nouriſhment to the plant to be produced. It may likewiſe be conſidered as a ſtimulus to the plants, and as operating mechanically, by dividing the ſoil and abſorbing water.

The ſeeds of moſt annual weeds contain oil in conſiderable quantity, particularly the different kinds of muſtard. Theſe are the greateſt enemies that farmers have to contend with, particularly upon light free ſoils, where, if a ſhower accidentally falls, immediately after the field is ſown, a thick crop of annuals immediately comes up, and very effectually ruins the grain.

Upon ſoils that abound with theſe ſeeds, lime will be found an effectual remedy, if judiciouſly applied ; indeed, in whatever form it is uſed, it will deſtroy them in a certain degree ; but if it is thoroughly incorporated with the earth, and the field laid down to graſs, the effect will be more certain, as the lime will not be diſturbed

bed in its operation upon the ſeeds, which it is liable to be, in caſes where the land is kept in tillage. Where this plan is followed, and the ground allowed to remain in graſs for two or three years, at the end of that time the annuals will be found deſtroyed, with this additional advantage that they will be converted into rich nouriſhment for the grain that is afterwards ſown. This laſt is no inconſiderable object; for whoever conſiders the immenſe numbers of annual ſeeds which are in all light ſoils, will be convinced that a very conſiderable quantity of nouriſhment, and that too of the beſt quality, will be acquired by their deſtruction. To deſtroy weeds in the firſt inſtance, is certainly an important point gained; but to convert them into manure for the grain, is turning a nuiſance into a benefit. Nor is this the only advantage that is gained; ſnails and other vermin, which are particularly baneful to green crops, are alſo deſtroyed.

Neceſſity of giving a thorough liming at once.—Conſidering lime as a ſubſtance operating upon the living ſubſtances contained in the ſoil, as well as mechanically upon the ſoil itſelf, we can readily perceive the utility, and even neceſſity of applying a ſufficient quantity of it at once, in order to produce theſe effects; for if the quantity employed is ſmall, and the ſoil deep, its effects will ſcarcely be viſible. Hence we can diſtinctly perceive, how a ſmall quantity of lime, laid upon particular ſoils, will often be loſt; whereas a larger doſe would have been highly beneficial. This circumſtance has led many farmers to imagine that lime would not anſwer upon their lands, and of courſe to abandon the uſe of it; whereas a little judgment would have convinced them that the miſcarriage was owing, not ſo much to the lime being improper, as the quantity being too ſmall.

We are of opinion, therefore, that a complete doſe of lime ſhould always be given at once, and that this liming ſhould be regulated by the deepneſs and other known qualities of the ſoil; for it cannot be too often repeated,

repeated, that what is a ſufficient doſe for one ſoil, will hardly be felt upon another; but when this quantity has once been laid on, it ought never afterwards to be applied by itſelf.

We cannot conclude this article without recurring to the manner of mixing lime with the ſoil. We have ſaid, that in order to be uſeful, it ſhould be well incorporated with the earth, and that frequent ploughings and harrowings are the only means to be depended upon for that purpoſe. The firſt thing to be noticed, is the ſpreading: This operation ſhould be performed with the utmoſt care, and if poſſible, always done in calm weather; for if the wind is high, a part of the ground will be whitened by a thin coat blown over it, which will deceive the perſon who ſpreads it; whoſe eyes, being annoyed by the lime, will not enable him to diſtinguiſh between the ſpots that are thus whitened by the duſt, and thoſe that have got a proper coat: Even with every poſſible care, the ſpreading will be unequal; ſo much ſo, that a common harrowing will not mix it properly. To obviate this, in ſome degree, buſh harrowing ſhould be practiſed. The next thing to be attended to, is the ſubſequent ploughings; and here it may be proper to obſerve, that they ſhould never be very deep, particularly if the quantity of lime has been moderate; for if the ſoil is deep, and the quantity of lime ſmall, very deep ploughing would not only bury a part of the lime, and place it beyond reach of being uſeful, but would mix it with too great a quantity of earth. To prevent this, where lime is ploughed in, the firſt furrow ſhould not be more than two or three inches deep, and the ſubſequent ploughings ſhould never exceed four inches; by this means the lime, as well as the ſoil it has acted upon, will be kept uppermoſt, and rendered uſeful; whereas by ploughing deeper and mixing it with more earth, the benefit would not only be leſs, but alſo more uncertain.

MARLS.

MARLS.

MARL is a ſubſtance, containing calcareous earth, found in the bowels of the earth in different ſituations and at various depths.

Clay-Marl.—Clay marl is ſo called from its reſemblance to clay, of which it contains a conſiderable quantity in its compoſition. It is of many different colors; but all of theſe agree in one particular point.

Stone-Marl.—Stone-Marl is ſo called on account of its hardneſs; and differs from the former in being leſs eaſily ſoluble in water.

Slate-Marl.—Slate-Marl is found in thin laminæ, or layers, like ſlates, and is of a conſiſtence harder than clay, and ſofter than ſtone-marl. This ſubſtance is alſo of difficult ſolution in water.

Shell-Marl.—Shell-Marl is diſtinguiſhable from every other ſubſtance of that nature, both by the ſhells it contains, and the coheſion of its parts, as well as its ſpecific gravity, being leſs than either of them. It is moſt frequently met with in ſituations where the ground has formerly been covered either by lakes or pools of ſtagnant water. When the ſhells are in a freſh ſtate, and covered with the enamel upon the out-ſide, ſhell-marl is of very little value; but when they are in a decayed ſtate, it is by far the richeſt and moſt efficacious of any that we are acquainted with.

The benefit of all marls in agriculture, is, in a great meaſure, owing to the quantity of calcareous earth which they contain; and according as they poſſeſs more or leſs of it, they are more or leſs valuable. The principal diſtinguiſhing mark of good marl is its efferveſcing readily with acids. This circumſtance, while it proves the exiſtence of the calcareous earth, may be made uſe of to determine the quantity of it; which is a matter of conſequence for farmers to aſcertain.

In all caſes, therefore, where lime and marl can be obtained with equal eaſe, a preference ſhould be given to lime for deep ſoils and coarſe meadows; and to marl for high, thin, gravelly lands, eſpecially if much wild

ſorrel grow upon them. There is ſcarcely a ſhape, in which marl can be uſed with ſuch propriety as upon theſe light lands when they are in graſs. The experience of farmers, in thoſe parts where marl is much uſed, abundantly confirms the truth of this doctrine, and, perhaps, by the uſe of marl in this way, with the aſſiſtance of top-dreſſings of compoſt afterwards, all poor, thin gravels, and even ſand, may be rendered more valuable than by any other mode of management.

But though we have thus decidedly given the preference to the uſe of Marl upon light ſoils, we by no means wiſh it to be underſtood, that it ought not to be applied upon any other: On the contrary, we think that upon ſtrong clays, if a ſufficient quantity is put on, it will be highly beneficial. Every deſcription of Marl, however, will not anſwer for this purpoſe: Clay and ſlate-marl, upon ſtiff lands, will increaſe their coheſion, and in place of ſerving, will injure them; but if ſhell or ſtone marl is uſed, the ſoil will be rendered open, and by its coheſion being broken, the water will find a readier paſſage through it; of courſe the land will be rendered deeper; the advantage of which every farmer knows.

POT-ASH; or FIXED VEGETABLE ALKALI.

THIS ſubſtance has hitherto been little uſed as a manure, though it forms an eſſential component part of all the fertilizing ſubſtances we know. It is an active principle in all vegetable manures, remains fixed in the fire, and is one of the moſt valuable articles obtained by paring and burning.

In ſpeaking of the operation of lime, we obſerved, that its effects were varied by an union with alkaline ſalts. This compound is better calculated to promote the putrefaction and diſſolution of animal and vegetable ſubſtances, than either of theſe can do in their ſimple ſtate.

In the moſt favourable ſituations, any thing that will increaſe the quantity or improve the quality of manure,

ure, is highly valuable; but in places poſſeſſing few natural advantages, and far removed from the means of improvement, any thing that can be a ſubſtitute for the ordinary manures will be eagerly ſought after, eſpecially if the article is of eaſy carriage and can be purchaſed at a moderate expence.

From a knowledge of the qualities of pot aſh, and careful trials of its effects, which will be ſeen in the experiments to be afterwards narrated, we are led to conſider it as the cheapeſt manure that can be employed in the remote parts of the country. The firſt coſt of the article is not great, and the quantity requiſite for an acre, ſo ſmall, that the expence of carriage will ſcarcely be felt, as one cart upon good roads, will be able to carry a load ſufficient for ſix acres.

In the experiments to be mentioned, little more than two hundred pounds were found ſufficient for an acre; but this was upon a deep ſoil, containing a very conſiderable quantity of animal and vegetable ſubſtances; for lighter ſoils, however, much leſs will be required, if laid on by itſelf: Indeed, upon very light ſoils, a compoſt, prepared with potaſh and oil, incorporated with mould, will be the beſt way of employing it. In this ſtate, it will, if applied as a top-dreſſing, very liberally reward the labour and expence of the farmer. Upon ſtrong clays and deep loams, however, it ought always to be applied by itſelf, eſpecially upon thoſe lands which the farmers call dead with over-manuring; and when the expence of carriage is conſidered, pot-aſh will be found a cheaper manure than lime. In one reſpect it is greatly ſuperior to it, as the union of potaſh with all the different acids forms a neutral, which is, in ſome degree, uſeful in vegetation; whereas, when lime meets with the vitriolic or ſorreline acid it is almoſt entirely loſt.

SOAP-ASHES.

SOAP-ASHES are, in ſome meaſure, the ſame as the refuſe of leach fields. They principally, however,

ever, conſiſt of lime, which is employed by the ſoap-makers to deprive the alkaline ſalts of their fixed air, and by that means increaſe their action upon the oil and tallow. The addition of lime to ſoap-aſhes is, therefore, unneceſſary; they are generally made into compoſts with earth and well fermented dung, in the proportion of two loads of dung to one of earth; the aſhes are then added, in the quantity of one load to ten of this mixture, taking care to turn and incorporate the whole completely. The quantity neceſſary for ſtrong clays or deep loams, is about ten cart loads of this compoſt to an acre. If the dung has been well fermented and properly reduced, perhaps the moſt profitable way of uſing this article will be as a top-dreſſing harrowed in with the grain; care, however, ſhould be taken, when it is employed in this way, that the cauſtic quality of the aſhes is properly blunted by a ſufficient mixture of dung and earth; for if this circumſtance is not attended to, and dry weather follows the ſowing, there will be a conſiderable injury to the ſeed.

Theſe aſhes, when beat ſmall, may be made into a very rich compoſt with oil and earth, and uſed as a top-dreſſing for young crops. In whatever ſhape they are uſed, they will be found to deſtroy ſlugs and vermin of every deſcription. This quality will render them highly valuable upon lands where the early wheat is injured by the worm. If they are either applied as a top-dreſſing, and harrowed in along with the ſeed, or uſed upon the young wheat in the ſpring, as ſoon as the worm appears, the evil will be completely prevented: Perhaps mixing it well with the ſoil at ſeed-time will be found preferable, as it will have a chance of killing the vermin in the embryo.

SOAP LEY.

SOAP-LEY conſiſts of alkaline ſalts and oil, and is produced by the diſſolution of ſoap in water. The inſtances in which this article has been employed as a manure

manure are few; but the ſucceſs of ſome experiments that have been made, has been ſufficiently great to attract the attention of the public; and ſhould future trials be equally favourable, we hope much leſs ſoapley will be thrown away.

The quantity of this article that is daily waſted about every town and village throughout the kingdom, is immenſe; and if properly collected would be found a valuable addition to the manures we already poſſeſs.* When collected if it is found inconvenient to ſpread it upon the field immediately, it may be mixed with earth or earth and dung, and in that form will be found an excellent compoſt. Indeed in whatever way it is uſed, it will inſure one or two good crops, but if made into a compoſt its effects will be more permanent.

WOOD ASHES.

THIS article is uſeful as a manure, principally on account of the quantity of fixed vegetable alkali, or pot-aſh, which it contains. It is proper, however, to obſerve, that the aſhes of ſome kinds of wood contain very little of vegetable alkali, ſuch as the different kinds of fir, pine, &c.; this obſervation is very requiſite to be known, as it informs the attentive huſbandman of thoſe kinds of wood which are the moſt likely to repay his labour, and furniſh him with a good manure when burnt. Oak, aſh, broom, ſouthernwood, hazel, hickery, furze, and moſt of the hard woods, abound with this alkali, and if their aſhes be properly prepared and applied in ſufficient quantity, they will be found to produce valuable effects.

Except upon the ſtrongeſt and moſt tenacious ſoils, the rich kinds of wood aſhes will be too ſtimulating a manure; perhaps they ought ſeldom or never to be uſed in any other form than that of compoſt, either with earth or dung, or with earth and animal ſubſtances, ſuch as blood, garbage, the carcaſes of dead animals, &c. Where theſe compoſts are well proportioned

* In *China* they are ſo attentive to minutiæ in regard to manure, that barbers are ſaid to preſerve careſully the ſoap-ſuds they have made uſe of.

ed and mixed, they may be applied either as top-dreſſings, or in the furrows for drill crops, with great eaſe, and with very profitable ſucceſs.

A very rich manure may be made by ſprinkling coarſe oil upon wood-aſhes, in the proportion of half a gallon to a load, then mixing the aſhes with equal parts of quick lime, and adding ſix loads of earth to one of this mixture. Twelve loads, ſo proportioned and mixed, will be a top-dreſſing ſufficient for an acre. When wood aſhes are applied by themſelves, they will produce the moſt permanent effects upon ſtrong clays, and heavy, deep inactive loams; upon light ſoils, or where the bottom is compoſed of chalk or limeſtone, they will be hurtful.

In all caſes where there is what is called a ſour ſoil, they will very effectually correct it, conſequently upon poor meadows, or ruſhy ground, they will produce effects ſimilar to lime, and if applied in ſufficient quantity, will very effectually kill the plants which formerly grew upon thoſe lands; this they will do upon their ſimple ſtate, but if mixed with quick lime, their beneficial effects will be heightened.

CONCLUSION.

SUCH are the facts and obſervations which are ſubmitted to the conſideration of the reader, on this important branch of Agriculture; from which it is ſufficiently evident, that the ſubject is far from being ſo well underſtood as could be wiſhed for; many preſent modes of practice requiring to be amended, and many points ſtill demanding inveſtigation and experiment. On the whole, however, it would appear, that if all the different ſorts of manures, above treated of, were properly collected, prepared and applied, they are ſufficient to preſerve, if not to increaſe the fertility of our ſoil; and to be the means of produciug a ſufficient quantity of ſuſtenance for the ſtock, and the people of the country.

It is more than probable, that from the attention which philoſophers have recently paid to vegetation, ſome diſcoveries may be made of the utmoſt importance to Agriculture, which may contribute very materially to augment the ſuſtenance, and conſequently to promote the moſt eſſential intereſts of ſociety. But more facts are wanting to form a theory of important application of practice. Experiments are wanting to ſhew the ſubſtances contained in different ſoils, to explain the comparative powers of different ſubſtances, in nouriſhing plants, and to aſcertain the greater quantity of nouriſhing matter which can be produced in different circumſtances. If the wealth of a nation depends upon the number of its inhabitants, and if that number depends upon the abundance of food which a country poſſeſſes, it naturally follows, that Agriculture is the moſt important political object to which the legiſlature of any ſtate can direct its attention ; and that the nearer it is brought to perfection, the more a nation is likely to enjoy internal happineſs, and external proſperity.

EXPERIMENT ON POTATOES.

IN the year 1798, a bad year for potatoes, I planted in the middle of a corn-field, four rows of potatoes, from one end of the field to the other. The land was good, very mellow, and what I laid down this fall to wheat. I dunged the ground all alike with a very good dunging. One row was planted with three ſmalleſt potatoes, none bigger than a pullet's egg; another row with ſix potatoes ſmalleſt; another row with three largeſt potatoes; and the other with ſix largeſt. They were with the early (but not the earlieſt) potatoes; white, and are very good. When the chief of the tops were decayed, I went through the field, and dug 6 rows, ſkipping 6 or 8 rows between each row I dug, and I found the produce as follows:

SMALL.

3s.	lb.	oz.	6s.	lb.	oz.
19 potatoes wt.	2	12	46 potatoes wt.	2	8
24	2	12	36	3	0
34	3	8	49	4	0
25	2	8	42	4	4
27	3	4	48	4	0
47	3	12	37	3	4
176	18	8	258	21	0

Average. — 29 ⅓ wt. 3 lb 1 ⅓ oz.

Average. — 43 wt. 3 lb 8 oz.

LARGE.

3s.	lb.	oz.	6s.	lb.	oz.
30 potatoes wt.	3	0	58 potatoes wt.	4	4
47	3	12	79	5	0
48	4	12	62	4	12
32	6	0	63	5	8
33	4	8	58	6	4
41	4	12	76	5	12
231	26	12	396	31	8

Average.

Average.	*Average.*
38 ½ wt. 4 lb. 7 ⅓ oz.	66 wt. 5 lb. 4 oz.

Average produce of 9 ſmall, 72⅓ wt. 6 lb. 9⅓ oz.; of 9 large 104½ wt. 9 lb. 11⅓ oz. Theſe were dug the 16th September. The ſeaſon had latterly been very dry, and the land, when I dug the potatoes, was dry as aſhes, and the potatoes alſo dry and no earth about them. I left 6 other rows, until the froſt had killed all vegetation; ſuppoſing there might be ſome difference, as there were fine rains after the firſt digging, I found them as follows:

SMALL.

3s.	lb.	oz.	6s.	lb.	oz.
49 potatoes wt.	5	8	29 potatoes wt.	3	12
53	3	12	22	3	12
35	3	4	37	3	4
40	2	12	26	3	8
54	4	8	30	3	8
30	2	12	33	3	0
261 wt.	22	8	177 wt.	20	12

Average.	*Average.*
43 ½ wt. 3 lb. 12 oz.	29 ½ wt. 3 lb. 7 ⅓ oz.

9 ſmall 73 wt. 7 lb. 3⅓ oz.

LARGE.

3s.	lb.	oz.	6s.	lb.	oz.
36 potatoes wt.	5	4	55 potatoes wt.	6	4
43	5	8	81	6	0
60	3	12	58	5	4
45	4	0	66	5	12
46	4	12	66	5	4
42	3	0	90	5	0
272 wt.	26	4	416 wt.	33	8

Average.	*Average.*
45 ⅓ wt. 4 lb. 6 oz.	69 ⅓ wt. 5 lb. 9⅓ oz.

9 large 114⅔ wt. 9 lb. 15⅓ oz.

JOSEPH BARRELL.

Pleaſant-Hill, Charleſtown, April, 1799.

Doctor A. DEXTER.

EXPERIMENT

EXPERIMENT ON CARROTS.

Dorcheſter, Auguſt 27, 1801.

DEAR SIR,

HAVING a favorable opinion of the culture of carrots, I was induced to try the experiment, the reſult of which I have now the pleaſure of communicating to you for the information of the Agricultural Society.

In November, 1799, I ſpread three ox cart loads of old ſtable manure on one-eighth of an acre of land, of a rich light loom, in which potatoes had been planted for two years preceding. I then ploughed it, and let it lay until the ſpring following, when, as early as the froſt was out of the earth, I repeated the operation, and about the beginning of May, I ploughed it for the laſt time; after which, I had the ſtones carefully raked out, made my furrows at the diſtance of a foot from each other, and in depth about one inch. I rubbed the ſeed well, ſo as to take of the beard, and ſowed my ground. In ten days, I could juſt perceive the carrots above the ſurface of the earth; and in ſix more, the rows were plainly diſcernable. I then hoed lightly between them, with a common broad hoe; in order to check the growth of the young weeds, which had begun to appear. This I performed again in about twenty days; and weeded the carrots by hand, where it was dangerous to apply the hoe. In about two weeks from this, they had acquired ſuch a degree of ſtrength, as to admit of their being thinned, which I performed after the firſt rain, leaving in the ground thoſe that I intended for maturity at the diſtance of about one inch from each other: In this ſituation I let them remain until the beginning of July, when I hilled them ſo as to cover the top of the root. Nothing more was done to them until the beginning of November, when my crop was collected, and meaſured *one hundred and ſixty buſhels*, excluſive of what had been uſed in my family from the 1ſt Auguſt.

As the foregoing was intended as an experiment, I was particular in keeping an account of the expences attending it, and find that the whole amount for manure, labour, &c. was *fifteen dollars and thirty-three cents*, including *one dollar and thirty-three cents*, which I paid for one pound of ſeed.

I am convinced that a Farmer, who has a conſiderable ſtock to provide for, cannot appropriate a few acres of his land to a better purpoſe, than that of raiſing carrots. Their nutritious property, ſupplies the uſe of hand food for beeves; and they are extremely ſerviceable to milch cows, who require ſomething better than dry fodder during our tedious winters. Horſes are very fond of them, cut in pieces of three inches in length, waſhed clean, and given to them in quantities, from one quarter, to half a buſhel, each, as may be judged proper.

I am, dear Sir,
with eſteem and reſpect,
young obedient humble ſervant,
S. BLAGGE.

Doctor DEXTER.

ABSTRACT

ABSTRACT *of the* TREASURER's ACCOUNTS.

The Maſſachuſetts Society for promoting Agriculture in account with AARON DEXTER, *Treaſurer.*

Dr. — *Cr.*

1799.

	D.	C.
To Jacob Kuhn's ſalary	25	
To caſh paid for wheat from Col. Wadſworth, ſtoring and delivery	46	71
To Edw. Hay, pr. order	12	50
To balance paid committee to transfer the property to new Treaſurer	643	35
	727	56

	D.	C.
By balance laſt account, as reported	197	93
By caſh for aſſeſſments	126	63
By do. for intereſt on Society's ſtock	381	
By wheat ſold	22	
	727	56

Property in hands of Treaſurer.

	D.	C.
United States' 6 per cent ſtock	2594	9
Ditto 3 per cent	583	
Deferred do.	800	
Maſs. State Notes, 5 pr ct.	1200	
U. States' Bank, 3 ſhares	1200	
	6377	9

The above account audited, and found to be well vouched and right caſt, and the balance of 643 dols. 35 cents due to the Society, and the evidences of the ſeveral ſpecies of property ſtanding in the name of Society, amounting to 6377 dols. 9 cents, nominal ſum, in the hands of the Treaſurer.

WM. SPOONER,
JOHN HANCOCK, } *Committee.*

July 2. 1800.

1800,
July 9.

	D.	C.
To Jacob Kuhn's ſalary	25	
Reverend Mr. Kirkland, per order	6	35
To caſh paid for printing	5	60
To do. for books purchaſed	39	96
To premium paid	30	
To 1205 dols. 91 cents, 6 per cent ſtock purchaſed	981	14
To balance due to Society	62	60
	1150	65

	D.	C.
By caſh of committee appointed to transfer the property of the Society from late Treaſurer	643	35
By intereſt on Society's ſtock	457	30
By caſh for aſſeſſments	50	
	1150	65

Property in hands of Treaſurer.

	D.	C.
United States' 6 per cent ſtock	3800	
Ditto deferred	800	
Three per cent ſtock	583	
Maſſachuſetts State Notes 5 per cent	1200	
United States' Bank, 3 ſhares	1200	
	7583	

The above account audited, and found to be well vouched and right caſt, and the balance of *ſixty-two dollars* and *ſixty cents*, due to the Society, and the evidences of the aforeſaid property in Treaſurer's hands.

JOSHUA THOMAS, *Committee.*

June 10, 180..

LIST OF MEMBERS

OF THE

Agricultural Society.

N. B. Thoſe who have no towns affixed to their names, belong to *Boſton.*

JOHN Adams, *Quincy.*
Jonathan Adams, *Northbridge.*
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